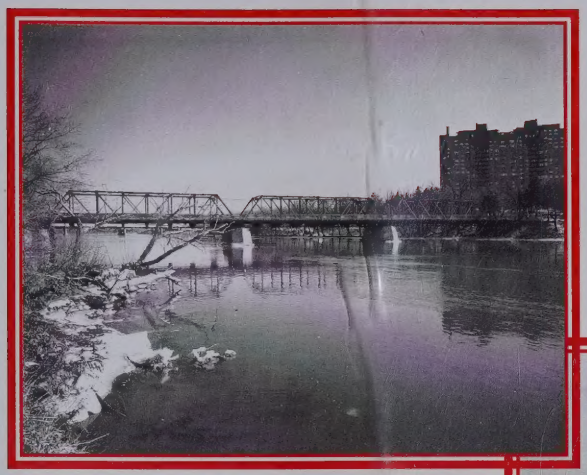


RARITAN RIVER CROSSINGS

History Study

Prepared For:

New Jersey Department of Transportation
Trenton, New Jersey

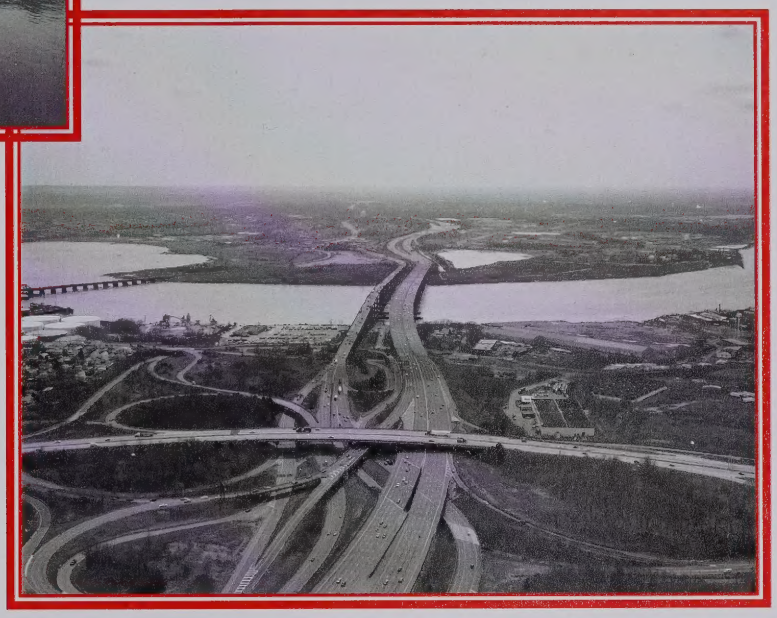
Prepared By:

The Louis Berger Group, Inc.
East Orange, New Jersey

January 31, 2001

NJ
F
142
R2
R3
2001
C.1

RARITAN RIVER CROSSINGS



History Study

Prepared For:

New Jersey Department of Transportation
Trenton, New Jersey

Prepared By:

The Louis Berger Group, Inc.
East Orange, New Jersey

January 31, 2001

NJ
F
142
R2
R3
2001
C.1

TABLE OF CONTENTS

TABLE OF CONTENTS

CHAPTER		PAGE
	List of Figures	ii
	List of Tables	iii
	List of Plates	iv
	Preface	v
I	INTRODUCTION	1
	A. The Study	1
	B. The Raritan River: Barrier and Highway	1
II	BEGINNINGS: FROM THE LATE PREHISTORIC PERIOD TO THE END OF THE AMERICAN REVOLUTION	5
	A. Indian Trails	5
	B. European Settlement in the Raritan Valley	7
	C. Travel Before the Revolution	19
	D. The American Revolution	20
III	FROM THE EARLY REPUBLIC TO THE TURN OF THE TWENTIETH CENTURY	22
	A. Introduction	22
	B. Population	23
	C. Economic Activity	24
	D. Transportation	32
	1. Roads	32
	2. Canals and Ferries	37
	3. Stagecoach Lines	43
	4. Steamboats	43
	5. Railroads	45
IV	THE TWENTIETH CENTURY	56
	A. Introduction	56
	B. Population	57
	C. Economic Activity	60
	D. Improvement of the Raritan and River Navigation	61
	E. The Rise of Automobile Ownership and Highway Construction	63
	1. The New Jersey Turnpike	79
	2. The Garden State Parkway	82
	F. Recent Improvements	84
	G. The Railroads	84
V	CONCLUSION	90
VI	BIBLIOGRAPHY AND REFERENCES CITED	93

NJ
F
142
R2
R3
2001
c.1

LIST OF FIGURES

FIGURE		PAGE
1	Location of Study Area	2
2	Raritan River Crossings, ca. 1684 to 1998	3
3	Conjectured Routes of Major Indian Trails	6
4	Eighteenth-Century Crossings of the Raritan River	10
5	River Crossings at New Brunswick and Raritan Landing, circa 1766	13
6	Artist's Conception of the Landing Lane Bridge as It Appeared in 1766	16
7	Ferry Crossings at Perth Amboy, circa 1781	17
8	County Population, 1800-1900	25
9	Nineteenth-Century Crossings of the Raritan River	34
10	Bridges at New Brunswick, 1850	39
11	Lithograph Showing First Railroad Bridge Over the Raritan River at New Brunswick	48
12	New York & Long Branch Railroad Bridge Over the Raritan River Between Perth Amboy and South Amboy, 1877	53
13	County Population, 1900-1990	58
14	Total Shipments on the Raritan River, 1890-1996	64
15	Selected Commodity Shipments on the Raritan River, 1910-1995	65
16	Twentieth-Century Crossings of the Raritan River	70
17	Proposed Raritan River Bridge Near New Brunswick, 1928	71
18	Map of New Jersey Showing Traffic Densities Throughout the State in 1926	76
19	Bridges at New Brunswick, 1910	86

LIST OF TABLES

TABLE		PAGE
1	Population in New Jersey and Selected Counties, 1726-1800	9
2	Population in New Jersey and Selected Counties, 1800-1900	26
3	Population in New Jersey and Selected Cities, 1800-1990	27
4	Total Capital Invested in Manufacturing in New Jersey and Selected Counties, 1840-1900	28
5	Total Number of Acres of Improved Land in Farms, 1850-1950	29
6	Population in New Jersey and Selected Counties, 1900-1990	59
7	Motor Vehicle Registrations, 1900-1995	67
8	Annual Motor Vehicle Registration for Selected Counties, 1925-1947	68

LIST OF PLATES

PLATE		PAGE
1	Landing Lane Bridge, Constructed in 1894	38
2	Albany Street Bridge, circa 1880	40
3	Albany Street Bridge, Downstream Elevation, Constructed in 1893, Railings and Fence Added in 1985	41
4	Second Pennsylvania Railroad Bridge, Constructed in 1878	49
5	Swing Span over D&R Canal	50
6	New York & Long Branch Railroad Single-Track Raritan Draw-Swing Span. Photo taken prior to 1908	54
7	Morris Goodkind Memorial Bridge, Upstream Elevation, Constructed in 1929; Southbound Span, Completed in 1974, to Rear	72
8	Victory and Amboy Bridges, circa 1927; New York & Long Branch Railroad Span Near Top of Photo	74
9	Victory Bridge in 1998	75
10	Edison and Victory Bridges, circa 1939	78
11	John A. Basilone Memorial Bridge in 1998	81
12	Route 9 Edison Bridge (left) and Alfred E. Driscoll Bridge in 1998	83
13	John A. Lynch Bridge in 1998	85
14	Landing Lane Bridge in 1998	85
15	Pennsylvania Railroad Bridge, Completed in 1903	87
16	New York & Long Branch Railroad Bridge, Completed in 1908	89

PREFACE

PREFACE

This study focuses on the history of the crossings that existed along the Raritan River between the head of practical navigation at Raritan Landing and the mouth of the river where it opens into Raritan Bay. The purpose of the study is to supplement the public's knowledge of the history regarding the crossing of this stretch of the Raritan River, which, over the past several centuries, has been a barrier to cross-state transportation and commerce. This work was conducted by The Louis Berger Group, Inc. (Berger), for the New Jersey Department of Transportation (NJDOT).

A study of this nature requires the assistance of numerous individuals and organizations, and Berger would like to express its thanks to the following:

David Mudge (NJDOT), Andrea Tingey and Charles Scott (New Jersey Historic Preservation Office), Christopher Baer (the Hagley Museum, University of Delaware), Bernadette Bouchier (New Brunswick Public Library), and the staffs of the New Jersey State Library, the New Jersey State Archives, the United States Army Corps of Engineers (New York District), the Newark Public Library, the Cranford Public Library, the Perth Amboy Public Library, the South Amboy Public Library, the New Jersey Institute of Technology Library, the Alexander Library (Rutgers University), Archives and Special Collections (Rutgers University), the Library of the New Jersey Historical Society, and the Firestone Library (Princeton University).

Craig Wolfgang acted as Project Manager for the study, assisted by Richard Affleck. Berger staff who conducted research for this project include Don Ehrenbeck, Leigh Ann Von Hagen, Craig Wolfgang, and Ingrid Wuebber. The report was written by Richard Affleck, Don Ehrenbeck, Philip Pendleton, Craig Wolfgang, Ingrid Wuebber, and Hope Luhman. Suzanne Szanto and Maribel Solivan provided editorial assistance. The graphics for the report were produced by Jacqueline Horsford, Linda Lipka, and Victor Reynolds. Rob Tucher produced the black-and-white plates.

I. INTRODUCTION

I. INTRODUCTION

A. THE STUDY

This document traces the development of the various crossings of the lower Raritan River, from the mouth of the river as far upstream as Raritan Landing, just to the west of New Brunswick (Figures 1 and 2). The upstream limit of the study area is a logical one, since the eighteenth-century port town of Raritan Landing represented the break-bulk point on the river (the location where cargo heading upriver was transferred to smaller vessels). This is not a study on the technology of bridge building or ferry operations, nor does it focus narrowly on when a specific crossing, whether ferry or bridge, went into or out of service. Rather, it seeks to put the crossings of the lower Raritan River into a regional historical perspective. These crossings were each part of a larger transportation network that was developed in response to a particular set of economic and social factors. In turn, these networks served to shape the social and economic relationships that had given rise to them.

B. THE RARITAN RIVER: BARRIER AND HIGHWAY

The Raritan River has its origins in the New Jersey Highlands, a region of broad flat-topped ridges and long, narrow, intermontane valleys that extend across northern New Jersey in a northeast-southwest direction. Two main branches (the North and South branches), as well as numerous tributaries, combine to form the Raritan River. The North Branch has its headwaters just north of Mendham, and from there flows swiftly west and south, entering the flatter terrain of the Piedmont near Far Hills. From here it continues south, skirting the western edge of the Watchung Mountains, to join the South Branch in the aptly named Township of Raritan. The South Branch takes a rather more circuitous route. Originating at Budd Lake, it flows through a steep, narrow gorge that cuts across Schooleys Mountain. Entering German Valley near Bartley, it swings to the southwest, coursing along the valley floor to High Bridge where it leaves the Highlands to flow through the lower, rolling terrain of the Piedmont. From High Bridge, the South Branch sweeps to the south and east in a broad arc, taking it past Flemington, Three Bridges, and Neshanic Station, to its confluence with the North Branch at Raritan.

Near Somerville, the Raritan is joined by the Millstone River and, turning southeast, it courses past Bound Brook—here the terrain begins to flatten out and the river slows and broadens. At Piscataway, near the eighteenth-century site of Raritan Landing, located just upstream from New Brunswick, the river is more than 200 yards wide. Once past New Brunswick and the head of deep-water navigation, the Raritan leaves the Piedmont and meanders through the Inner Coastal Plain to Raritan Bay. Extensive marshlands border the river on either side; drier ground near the river is generally low-lying, broken by occasional bluffs that rise 50 feet or more above the surrounding terrain. Much of the channel is shallow in this slow-moving lower stretch of river, with extensive sandbars present in some areas, particularly in the slack water along the inside of the bends. As it flows past Sayreville, the Raritan broadens to over one-half of a mile wide, coursing around several large marshy islands that take up the center of the river. At its mouth, at Perth Amboy, the Raritan River is over three-quarters of a mile wide.

Like any river, the Raritan possesses a dual nature. On the one hand, it is an artery, a highway into the interior that, during the eighteenth and early nineteenth centuries, connected the rural hinterlands with the cities of New Brunswick, Perth Amboy, and New York, and points beyond. Agricultural products were shipped downriver from the interior to port towns like Raritan Landing, where they were loaded onto larger vessels plying the coastal or West Indian trade routes. Manufactured goods—from London or New York, for example—moved in the opposite direction. Sloops and schooners sailed upriver as far as New Brunswick

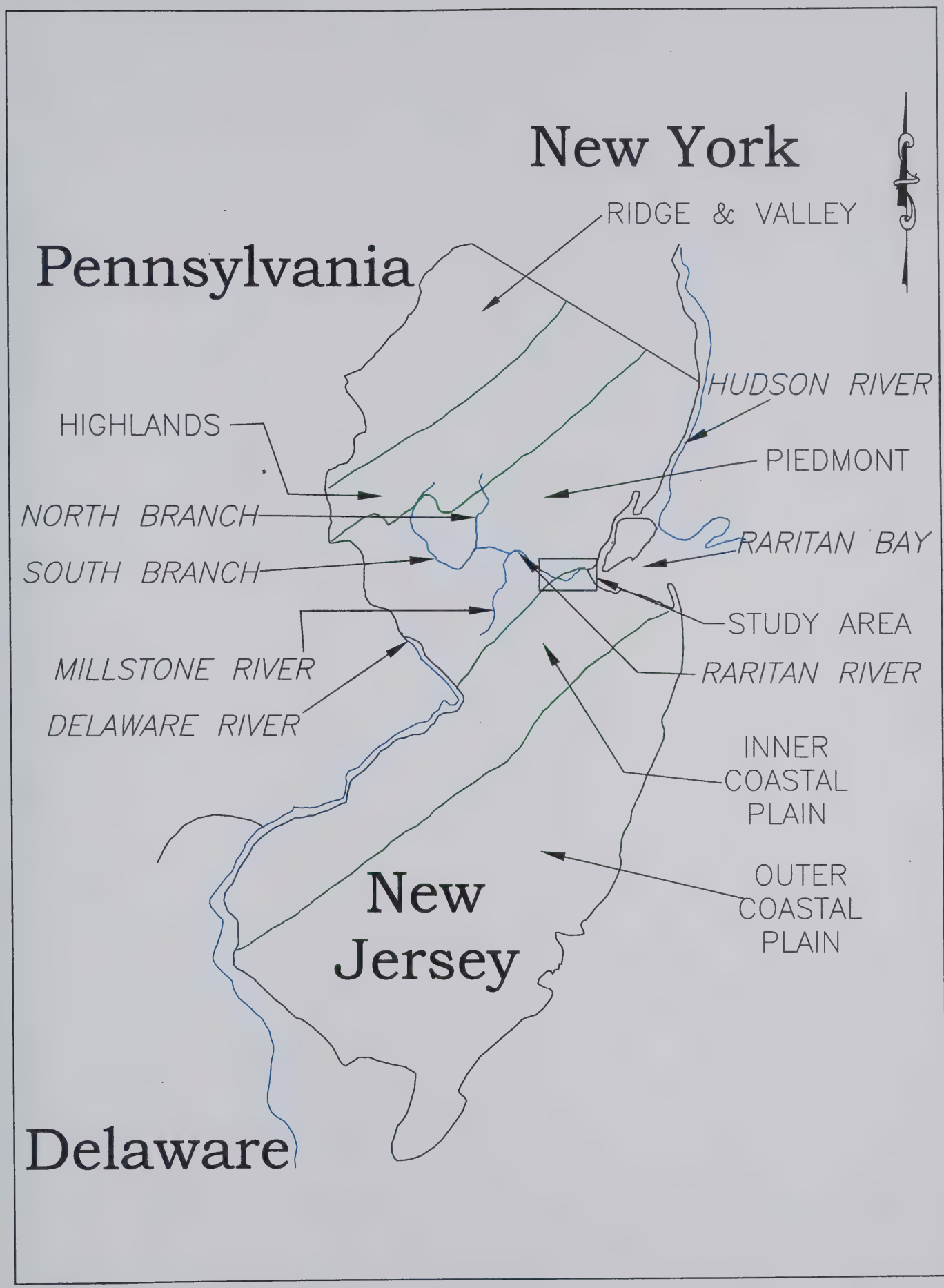
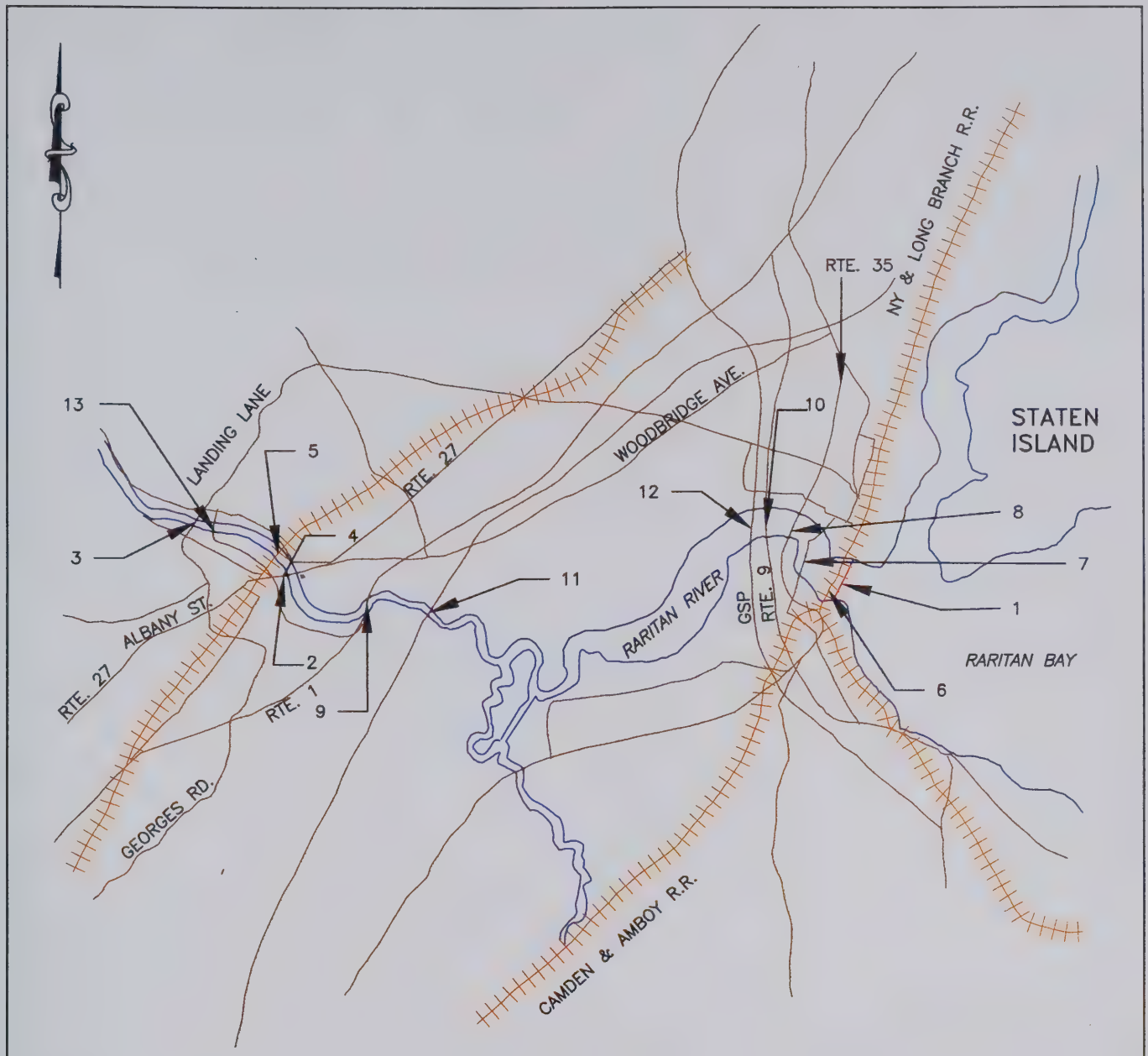


FIGURE 1: Location of Study Area



LEGEND

ROADS AND HIGHWAYS

RAILROADS

1 LONG FERRY–1684

2 INIANS FERRY–1686

3 LANDING LANE BRIDGE–1766, 1833, 1895

4 ALBANY STREET BRIDGE (ROUTE 27)–1794, 1851, 1893

5 NORTHEAST CORRIDOR RAILROAD BRIDGE–1837, 1879, 1903

6 NEW YORK & LONG BRANCH RAILROAD BRIDGE–1875, 1908

7 PERTH AMBOY DRAWBRIDGE–1906

8 VICTORY BRIDGE (ROUTE 35)–1926

9 MORRIS GOODKIND MEMORIAL BRIDGE (ROUTE 1)–1928 TO 1929

10 EDISON BRIDGE (ROUTE 9)–1939

11 JOHN A. BASILONE MEMORIAL BRIDGE (NJ TURNPIKE)–1951

12 ALFRED E. DRISCOLL BRIDGE (GS PARKWAY)–1954

13 JOHN A. LYNCH BRIDGE (ROUTE 18)–1980S

0 1 2 3 4 MILES

FIGURE 2: Raritan River Crossings, ca. 1684 to 1998

or Raritan Landing where the cargo was transferred to shallow-draft vessels for shipment further upstream, or onto wagons for transport overland. Although the importance of the Raritan River as a transportation artery waned during the late 1800s, its lower stretch, near Perth Amboy and Sayreville, remained an important harbor and anchorage well into the present century.

The Raritan River has also been a barrier. Cutting across the central part of the state, it has impeded movement along what would, over the course of three centuries, become the most heavily traveled corridor in the United States. During colonial times, the principal route between New York and Philadelphia intersected the Raritan at New Brunswick, where travelers would cross by ferry before resuming their trip by road. Before the end of the eighteenth century, a wooden bridge had been built at Raritan Landing, and a wooden drawbridge had been "thrown" across the river at New Brunswick, the first of many bridges built across the three-mile-long stretch of river between Raritan Landing and Lawrence Brook. Much the same situation held for the lower end of the Raritan. Travelers heading south from Perth Amboy were faced with a nearly one-mile-wide expanse of water at the mouth of the river which until the late nineteenth century could be crossed only by ferry. The New York & Long Branch Railroad was first to bridge the river here, in 1875, while roadway bridges would wait until the twentieth century and the advent of the automobile age.

Completion of the Outerbridge Crossing to Staten Island in 1928 brought thousands of motorists into Middlesex County, forcing construction of the Edison and Victory bridges over the Raritan. The New Jersey Turnpike and the Garden State Parkway, completed in the early 1950s, crossed near the Raritan River, bringing the end to undeveloped land in Middlesex County. With the seventh largest population among the state's counties in 1950, Middlesex became the third largest by 1990, behind Bergen and Essex.

II. BEGINNINGS: FROM THE LATE PREHISTORIC PERIOD TO THE END OF THE AMERICAN REVOLUTION

II. BEGINNINGS: FROM THE LATE PREHISTORIC PERIOD TO THE END OF THE AMERICAN REVOLUTION

A. INDIAN TRAILS

Long before Europeans arrived on the scene, the Native American inhabitants had carved a network of trails through the dense forests of New Jersey (Figure 3). Generally following lines of least resistance, these pathways wound across the landscape, along areas of dry, relatively low terrain and easily ascended grades. Major trails connected village sites with one another, while the minor paths branched off the major footways and led to hunting and fishing areas, campsites, rockshelters, and quarries (Wacker 1975:70). Several of the major trails that have been identified, or whose courses have been conjectured, intersected the lower Raritan River (see Figure 3).

The Assunpink Trail (also known as the Upper Trail) led from the "falls of the Delaware," roughly paralleling the valleys of Assunpink Creek and the Millstone River, crossing the Raritan at present-day New Brunswick at or near the location that would become Inian's Ferry (see Figure 3). The river was apparently shallow enough at low tide that it could be forded at this location. At New Brunswick, the Assunpink Trail was joined by the Lower Trail, which extended northward from present-day Burlington, through Hightstown and Milltown, to the Raritan River. North of the Raritan, the Assunpink Trail ran northeastward to the vicinity of present-day Elizabeth, where it connected with a path that continued northward toward the Passaic and Hackensack rivers.

The Minisink Trail ran from the mouth of the Shrewsbury River at the Navesink Highlands, northwest to Minisink Island in the Delaware River (Ellis 1885:50, 370). Skirting the southern shore of Raritan Bay, it passed the future site of Middletown, and crossed the Raritan River about three miles above Perth Amboy, probably in the vicinity of present-day Sayreville (see Figure 3). Here, the crossing would probably have been accomplished by canoe, since this stretch of river is not fordable. From the Raritan, the trail then ran to a point about five miles west of Elizabeth before turning northwestward to the Minisink area in the northwest corner of New Jersey (Pickersgill 1937:18-19). A branch of the Minisink Trail extended eastward from Metuchen to Perth Amboy and westward through Bound Brook and Clinton to Phillipsburg on the Delaware River. A similar route, known as the Burlington Path, had one branch that began at Trenton, and another at Burlington, with both joining near Crosswicks and extending southwest through Monmouth County, before merging with the Minisink Path near Middletown (Ellis 1885:50). Other, less important paths, such as the Fish Path and Cedar Path, stretched across inland areas to points along various water routes (Ellis 1885:50, 370).

The names of these early trails came from a variety of sources. The Minisink Trail was named for Minisink island, inhabited by one of a number of local Indian bands recorded by early European explorers (Kraft, in press). According to some historians, the term "minisink" is a combination of the word "minsi," which means "people of the stony country" or "mountaineers," and "ink," which means "place" (Becker 1964:8, 41). Assunpink was the Indian name for one of the nearby streams (Cunningham 1966:25). The word "assunpink" is a combination of "assan," which means "stone," "pe," which means "water," and "ink," which means "place," thus translating to "stone water" or "stone in the water" (Becker 1964:8). However, many of the names attributed to Indian groups are actually anglicized derivatives recorded by the first explorers and colonists (Cunningham 1966:25). European writers often approximated the spelling of the strange-sounding Indian words phonetically, resulting in terms that were a hybrid of both cultures (Kraft, in press). Other names, such as the Fish Path or Cedar Path, likely resulted from some physical or biological feature of the area through which the trails traversed.

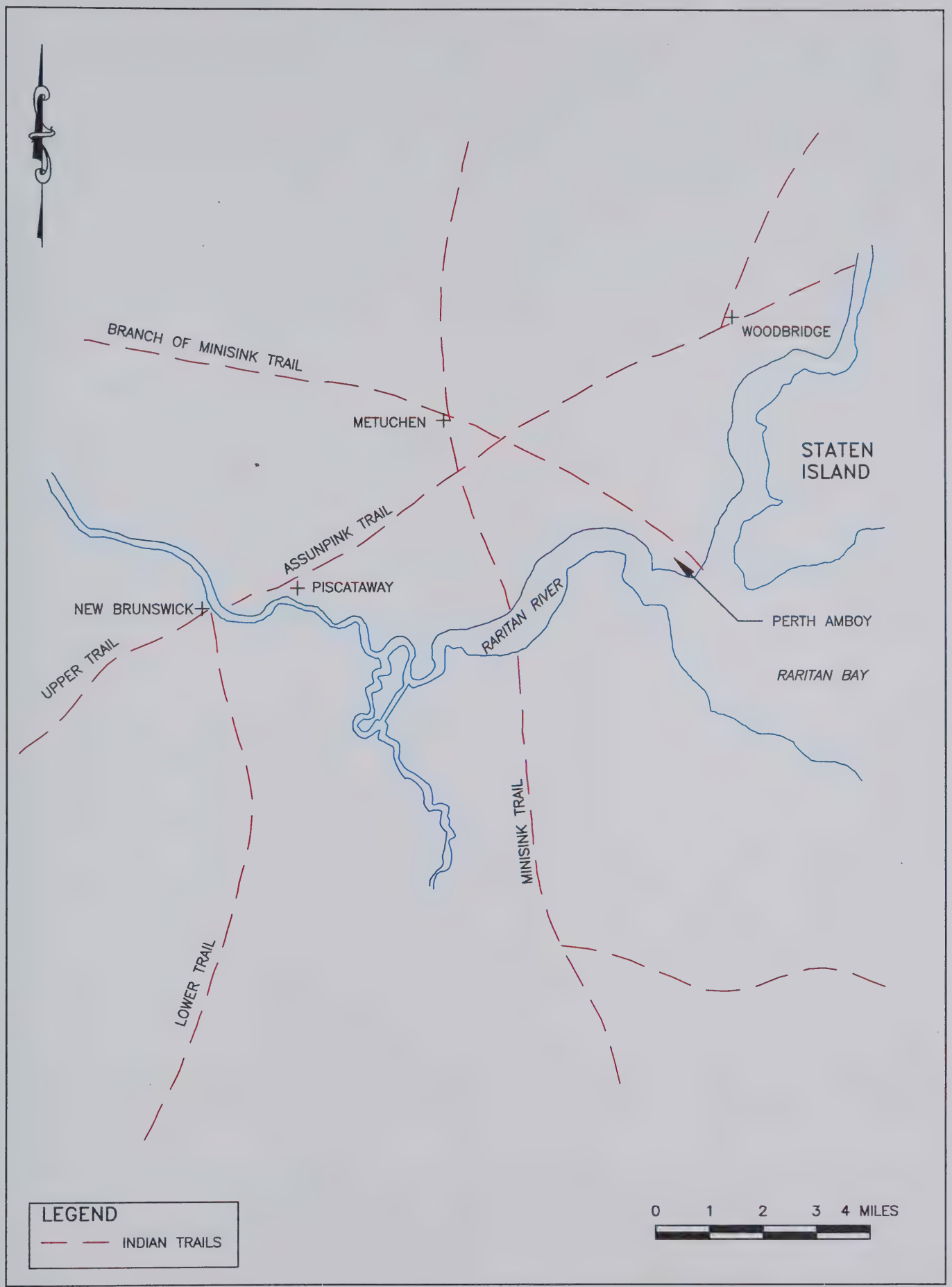


FIGURE 3: Conjectured Routes of Major Indian Trials

SOURCE: Wacker 1975

Beginning in the seventeenth century, European settlers took advantage of portions of these existing byways, widening them to accommodate cart and wagon traffic. Over the following centuries, parts of these former Native American trails were further widened, paved, and incorporated into the expanding network of roads and highways of New Jersey. A segment of the Assunpink Trail, for example, became known as the Old Dutch Road (Lane 1939:26); from New Brunswick it followed the present route of N.J. Route 27 to Princeton and was incorporated into U.S. Route 206 between Princeton and Trenton. Similarly, part of the Minisink Trail was incorporated into Kings Highway-Holland Road in the vicinity of Middletown, and followed the course of N.J. Route 34 north of Old Bridge. North of the Raritan, the Minisink Trail followed the approximate alignment of County Route 531 to Plainfield. Lawrie's Road (presently Bordentown-Amboy Turnpike, Old Stage Road, and Cranbury-South River Road), named for Gawen Lawrie, the deputy governor of East Jersey during the late seventeenth century, may also have followed an earlier Native American trail. It connected South Amboy, opposite Perth Amboy, the capital of East Jersey, to Burlington, the capital of West Jersey (Lane 1939:36). At Cranbury, roughly midway along its course, it joined the Lower Trail.

B. EUROPEAN SETTLEMENT IN THE RARITAN VALLEY

European settlement of the Raritan River Valley began in the 1660s. The first settlers were attracted to the valley by its agricultural potential, and they established farms adjacent to the river and its tributaries. The majority of these early arrivals were English settlers from New England, who established the towns of Woodbridge and Piscataway in 1666. These settlements were important not only for their early date, but also for their physical form. Both Woodbridge and Piscataway were originally laid out using the New England town lot system, with the inhabitants residing within a nuclear village surrounded by their various tracts. The Raritan River provided ready access to these lands and the settlements they supported. The importance of the Raritan River as a transportation route led to the early establishment of landing sites such as Piscataway Landing, which provided the facilities necessary for the transport of individuals and freight (Berger 1983:28).

Until the 1660s, settlement in New Jersey had resulted primarily from Dutch and Swedish efforts. The Dutch, however, had focused on the Hudson Valley, while Swedish and Dutch merchants had formed the New Sweden Company, under the aegis of the Swedish crown, to take advantage of the Delaware Bay and River region. In 1664, King Charles II of England moved to reassert his government's claims to New Netherlands, a territory with rather vague boundaries stretching from Long Island Sound to Delaware Bay. On March 12, 1664, the king deeded the general region to his brother, the Duke of York, later King James II. The Duke of York in turn granted portions of his claim to Sir George Carteret and John, Lord Berkeley. The colony was divided in two in 1676, with Carteret's interest taking in East Jersey. When Carteret died in 1680 his will stated that the province of East Jersey was to be sold to pay off his debts. He appointed trustees of his estate to carry out his wishes. They sold the province to William Penn and eleven other associates, thereby creating the East Jersey Board of Proprietors. The Proprietors bought the province for £3,400. Each of the twelve took in a partner, so that twenty-four shares were created. The new partners, including James, Earl of Perth, vigorously promoted emigration from Scotland to East Jersey, an effort that helped form Middlesex County in 1682 (Monmouth County was also one of the first four counties formed in that year), and the Raritan Valley, one of the most culturally heterogeneous regions of New Jersey during the colonial period (Wacker 1975:121-126, 162). By 1688 the increase in settlement—mainly by Dutch farmers—brought about the formation of Somerset County from the western portion of Middlesex County (Wacker 1975).

The initial wave of settlement in the Raritan Valley was rapidly followed by a larger influx, which started in the 1680s and continued into the eighteenth century. Many of the new settlers were of Dutch origin, some of them relocating from Manhattan and southern Long Island. With them came large numbers of Africans,

nearly all of whom were slaves. Additional English and some Scotch-Irish were also involved, but within a fairly brief period the valley had taken on a strong Dutch flavor. One result of this new influx was the decline of the New England pattern of settlement, which was superseded by the familiar New Jersey isolated farmstead system. In river valleys such as the Raritan, these isolated farmsteads were invariably established in conjunction with a long lot system of land division; in some areas this sparse settlement pattern remained intact into the twentieth century (Berger 1991a:11). Under this system, individuals were allotted a plot of land with a narrow river frontage and a long, narrow tract extending away from the river and on to the more fertile uplands. This allowed the maximum number of settlers to enjoy the various advantages of land associated with the river, including access to transportation facilities, water, salt marsh, and lowland grazing and hunting areas (Dunham 1766; Heritage Studies, Inc. 1984:15). Superimposed on this landscape of scattered farmsteads were an increasing number of villages and towns which tended to develop around specific stimuli, such as river landings, crossroads, and mill sites (Berger 1983:28).

The Raritan Valley, and the surrounding region, became an agricultural area of some consequence, with farmers producing wheat and flour for both export and local consumption. By 1750, the area was the chief supplier of much of the flour marketed to New York City, and the mills were among the best in the region. Gristmills and sawmills were among the first industries established in the county, and their operation was an integral part of the agricultural economic base (Berger 1991a:11; Mihalenko 1977:21). Indeed, regional agricultural expansion required the development of available waterpower sites, both to provide sawn lumber for new farm buildings and to process agricultural products. The Raritan River and its tributaries provided many fine waterpower sites on which a number of early gristmills and sawmills were established. Both gristmilling and sawmilling continued to be important activities well into the nineteenth century despite the expansion of the region into various other economic pursuits, and agriculture dominated the area's economy throughout the eighteenth and into the early nineteenth century (Berger 1983:29).

Middlesex County, and the adjacent counties of Monmouth and Somerset, grew steadily in population throughout the eighteenth century (Table 1). For Middlesex County, the highest growth rate occurred in the years between 1738 and 1745, for an average increase of 8.5 percent per year. This was the result of natural increase and continuing immigration. Monmouth County experienced a similar pattern of growth; between 1738 and 1745, the population increased by over 40 percent, with an average yearly growth rate of nearly 6 percent. Somerset County, in contrast, saw a net decrease during this same period. Wacker attributes this, at least in part, to unrest associated with the East Jersey land riots, which were brought on by conflicting claims of the Elizabethtown Associates and the East Jersey Proprietors (Wacker 1975:148). Resolution of the situation in Somerset County saw the resettlement of claims by their previous occupants, and an influx of new settlers during the 40-year period between 1745 and 1784. These two factors resulted in an average increase of 5.7 percent per year, far higher than was the case for either Middlesex or Monmouth counties.

Population growth and the agricultural development of the region during the late seventeenth century and the eighteenth century also helped to bring about the expansion of the transportation network that centered on the Raritan River (Figure 4). The increase in settlement had, as early as the third quarter of the seventeenth century, created a need for improved land transportation, and so in 1675 the provincial government appointed commissioners to "lay out common highways." According to Ellis, "in 1682, the Proprieters' Assembly passed 'An Act for making and Settling Highways, Passages, Landings, Bridges and Ferries within this Province' and appointed commissioners for that purpose" (1885:371). In March 1683, a commission was created to "lay out and appoint" in the several counties, "all necessary highways, bridges, passages, landings, and ferries, fit and apt for traveling, passages, and landing of goods" (Cawley and Cawley 1965:16). The Old York Road (not to be confused with Lawrie's Road, also called Old York Road) incorporated several earlier (extant) roadways, such as the "King's Highway" and the River Road along the Raritan from "The Forks." The road between Coryell's Ferry (Lambertville) and the Elizabethtown Point

Table 1: Population in New Jersey and Selected Counties 1726-1800

	New Jersey		Middlesex County (1)			Monmouth County (2)			Somerset County		
Year	Population	% Growth	Population	% Growth	% of State	Population	% Growth	% of State	Population	% Growth	% of State
1726	32,442		4,009		12.4%	4,879		15.0%	2,271		7.0%
1738	46,676	43.9%	4,764	18.8%	10.2%	6,086	24.7%	13.0%	4,505	98.4%	9.7%
1745	61,403	31.6%	7,612	59.8%	12.4%	8,627	41.8%	14.0%	3,239	-28.1%	5.3%
1784	149,435	143.4%	12,005	57.7%	8.0%	14,708	70.5%	9.8%	10,476	223.4%	7.0%
1790	184,139	23.2%	15,956	32.9%	8.7%	16,918	15.0%	9.2%	12,296	17.4%	6.7%
1800	211,149	14.7%	17,890	12.1%	8.5%	19,872	17.5%	9.4%	12,815	4.2%	6.1%

(1) Middlesex County originally included land that became part of Mercer County

(2) Ocean County was originally part of Monmouth County

Source: Wacker 1975

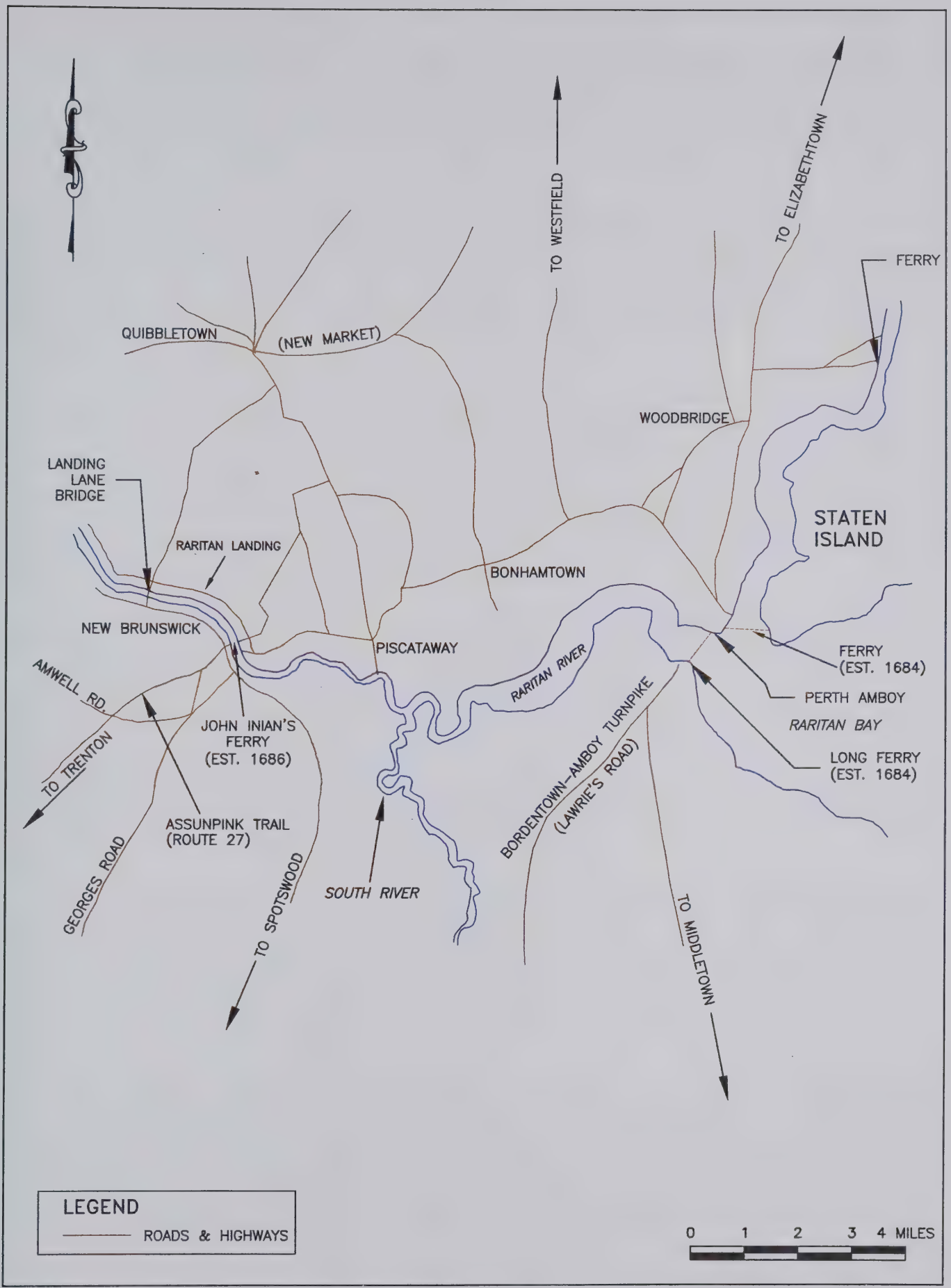


FIGURE 4: Eighteenth-Century Crossings of the Raritan River

SOURCE: Dunham 1766; Hills 1781

Ferry was already in use by the 1670s (Cawley and Cawley 1965:17). The assembly also found it necessary to set up Road Boards for each of the three counties of Bergen, Essex, and Middlesex. The boards were empowered to lay out highways, bridges, passages, landings, and ferries. Highways, bridges, and ferries were the property of their respective counties and had to be built and maintained by the people and towns that benefited from them. Inhabitants of each town were commissioned to raise money to pay for these improvements (Lane 1939:34).

River traffic greatly increased in volume as settlement in the valley developed, and the Raritan became the major means of shipping agricultural products to market. Numerous landings appeared along the river, such as Raritan Landing, New Brunswick, and Perth Amboy. All three of these places would develop into secondary centers of trade—critical links in the mercantile network connecting the rural farmers with the commercial centers of New York and Philadelphia, and beyond to the North American and Caribbean colonies, and to London.

Perth Amboy, at the mouth of the Raritan, was surveyed in 1683, having been chosen by the Proprietors to serve as the capital and chief city of East Jersey. The Proprietors' stated intention was to "build a convenient town for merchandise, trade and fishery" (McGinnis 1958:23). Perth Amboy had been part of a large tract of land called "Ompoge" purchased by August Hermann from the Native American inhabitants in 1651. The same land was sold to someone named "Boiley" around 1665, and the tract became known as "Emboyle or Amboyle" (McGinnis 1958:4), although it has also been argued that the name derives from the Lenape word for point, i.e., "Ambo" (Wacker 1975:117-118). That same year, rights to the land, using the name "Arthur Cull or Emboyle," were transferred to Philip Carteret.

The Proprietors had chosen Perth Amboy as their principal town and port of entry for the Raritan because of its location on a navigable river. It had good soil and fresh water, and, best of all, a fine harbor that would remain open year round, where large ships could come up directly to the shore (McGinnis 1958:30). To make their ambition a reality, the Proprietors divided 1,500 acres at Perth Amboy into 150 lots. The 10-acre lots were offered for £15 to those who took advantage of the sale before December 25, 1682, and for £20 thereafter. The town itself would be divided into 150 equal shares and laid out into streets. Public market places, buildings, and wharves were also to be laid out. Each purchaser of a Perth Amboy lot was required to build a house within three years or default on the lot. The Proprietors intended that they themselves should also each build a house at Perth Amboy, and further proposed to hire an assortment of artisans and laborers during 1683 to help build the town (McGinnis 1958:24).

Samuel Groom, the Surveyor General in East Jersey, wrote in 1683 that salt and fresh meadows lay on both sides of the Raritan River. He estimated that over 3,000 acres of meadowland abutted the river near Perth Amboy. Groom described the upland adjoining the meadows as "mean land" in the section lying between Perth Amboy and the confluence of the South River. He wrote that three houses had already been built and three more were under construction, but that labor was extremely scarce. He also noted that the Indians came down the Raritan past Perth Amboy to procure fish, fowl, oysters, etc., and brought a great deal of items to trade in New York (McGinnis 1958:26-27).

During the first two decades of settlement, the Raritan could only be crossed by fording or by boat, if the traveler was lucky enough to find someone willing to transport him or her across the river. At least one late seventeenth-century traveler's account records such a crossing. In November 1679 Jasper Danckaerts and Peter Sluyter journeyed from Elizabeth to Trenton. Along the way they stopped at Piscataway. A little further on they came to Dr. Henry Greenland's ordinary (tavern), at the place where the road crossed the Raritan River. The site of this tavern is on the north side of the Raritan near present-day Johnson's Pond,

opposite New Brunswick. Because the water was high, the pair crossed by canoe, letting their horses swim (Menzies 1969:39).

The site that would eventually become New Brunswick ultimately benefited from the development of the regional road system, as several important thoroughfares—the Upper Road and the Lower Road—met and crossed the Raritan at a spot where John Inian would establish a ferry seven years after Danckaerts and Sluyter had traveled this way (see Figure 4). Inian had been granted ferry rights for fifteen years by the Proprietors in 1686 (Board of Proprietors 1949:10). Twelve years later, he received a patent for his ferry across the Raritan. He was required to pay an annual fee of five shillings to the East Jersey Proprietors and to provide free ferry service to post and public messengers (Lane 1939:43). Ferry service at this location —the foot of Albany Street—would continue, under various individuals, for more than a century (Figure 5). Amenities for travelers taking the ferry were probably rather basic and, at least in the beginning, were often provided by the ferry master. By 1730 a ferry house, a tavern that would have provided food and lodging, had been constructed on the New Brunswick side of the Raritan. A counterpart on the north bank was in place by 1766 (Dunham 1766).

John Inian first settled in the area around 1681 (Cunningham 1966:115). His contribution to the development of what would eventually become New Brunswick cannot be overstated. He was instrumental in clearing and marking a six-mile stretch of the Assunpink Trail, which provided a shortcut between the head of navigation on the Raritan River and Burlington on the Delaware River (Menzies 1976:8; Wildes 1943:61). He also improved and shortened the "Lower Trail" to Burlington and opened a route north to Piscataway (Lane 1939:39). An early proponent of public works projects, Inian cleared an area at the first good ford on the Raritan in 1686, at a point where large, cargo-laden ships could successfully navigate the river at low tide. Here, he began a ferry known alternately as "Inian's" or "Onion's" ferry. Inian's vision of New Brunswick as an important hub in the colonial trade network proved accurate, as flatboats carrying tons of grain and lumber docked at his landing to transfer goods to ships bound for New York, England, or the West Indies (Wildes 1943:61-62).

Inian's crossing was critical in many ways to the development and prosperity of New Brunswick. At the time, Inian's Ferry was the first to exploit the vital connection across the river that linked East and West New Jersey, New York and Philadelphia, and New England and the South (Cunningham 1966:115). Wealthy merchants built houses along either side of the road leading to Inian's Ferry. Inian owned two lots consisting of a combined total of 1,280 acres, of which 80 chains (5,280 feet) fronted the Raritan River (Nielson Papers 1904). The inn he ran attracted a diverse clientele that included soldiers, merchants, traders, and travelers from all over the colonies and Europe, giving the settlement a cosmopolitan, worldly feel (Wildes 1943:62-63).

The village that grew up at this location was, not surprisingly, known as Inian's Ferry until the early eighteenth century, when its name was changed to New Brunswick. By the middle of the eighteenth century, the agricultural and transportation advantages of New Brunswick had made it the hub of the Raritan Valley and one of the largest settlements in New Jersey. New Brunswick also emerged during this period as a major entrepôt for trade with New York, Philadelphia, and other east coast ports (Berger 1983:29). Raritan Landing, just upstream from New Brunswick, had also emerged as a thriving port town during the eighteenth century. Established about 1695, the community had developed as a port by 1720. Prior to 1740, the Raritan Landing traders had maintained close ties with New York, including connections with some of that city's leading commercial families (the Hardenbrooks, Bayards, and Gouverneurs). After 1740, ties with New York diminished, while connections between Raritan Landing and New Brunswick were strengthened. The two communities appear to have shared in the booming business in trade and seem to have grown closer to one another in terms of kinship, marital, commercial, and institutional links (Yamin 1982, 1988). Trade

FIGURE 5: River Crossings at New Brunswick and Raritan Landing, circa 1766 *SOURCE: Dunham 1766*

remained the principal occupation of the residents of Raritan Landing until after the French and Indian War, when industries such as milling, baking, and brewing began to take on more importance.

In the decade before the American Revolution, which would have a dire effect on the community, a bridge was built at Raritan Landing. This structure, completed before 1766 (see Figure 5), was known as the Landing Bridge or the Landing Lane Bridge. The bridge, and Landing Lane, which ran perpendicular to the river, connected the Great Road Up Raritan (present-day River Road) on the north bank of the river with George Street, which extended along the south and east bank of the Raritan on the New Brunswick side (Dunham 1766). It is not known what the original Landing Bridge looked like, but it was probably a fairly simple wooden bridge set on stone piers. Indeed, most of the bridges built in colonial New Jersey were constructed of timbers, with plank flooring.

Bridge building, like road design, came under the auspices of local government officials. The earliest bridges in colonial America were little more than felled logs across a stream, adequate for a single pedestrian or horse. Occasionally, a handrail would be erected along one side. The relative scarcity of bridges in seventeenth- and eighteenth-century New Jersey was due in large part to two main factors: cost and lack of durability. The cost of building a bridge was considerable, with the outlay borne by either the town, county, or a combination of the two. Occasionally, funds were secured by lottery. A bridge spanning the Raritan at Bound Brook was erected in 1762 with $1,400 raised through a lottery. Aside from the cost, the simplicity of colonial bridge design and fragility of the product resulted in periodic interruptions of service due to the ravages of time and the elements. Bridges required frequent repairs and were endangered by flooding and ice floes (Lane 1939:46). A notice in the *New York Gazette* on February 5, 1770, reported that, "the fine Bridge lately built across Raritan River, near Bound-Brook, was carried away by the ice" (cited in Lane 1939:46). An act relating to bridges, promulgated in 1774, ordered that bridges on highways should be at least 12 feet wide, have at least four sleepers, and have well-laid flooring (Lane 1939:46-47). All of the bridges mentioned in the Middlesex Freeholder minutes between the years 1785 and circa 1840 appear to have been 12 to 14 feet in width (Board of Chosen Freeholders of Middlesex County [Middlesex Freeholders] 1785-1840).

The existence of so few stone bridges in colonial New Jersey is testament to the expense required for their construction. The largest one in New Jersey was probably over the Assunpink Creek at Trenton. However, this bridge was initially constructed of wood, having been transformed incrementally due to structural deficiencies, first with a stone pillar to support the wood sleepers, and later, as a complete, double-arched stone structure (Lane 1939:46-47). In 1809 plans for a new bridge over the Mile Run Brook near New Brunswick called for, "stone piers with a covering of timber planks" (Middlesex Freeholders 1809). The overall paucity of bridges in eighteenth-century New Jersey is exemplified by the 1768 map of New Jersey, which shows a ferry at South Amboy, but no bridges at any point along the Raritan River (Holland and Jeffreys 1768). By the early nineteenth century, bridges constructed partially or wholly of stone became more commonplace. In 1808, Treasury Secretary Gallatin observed that, ". . . in the lower counties of Pennsylvania, stone bridges are generally found across all the small streams" (Jackson 1994:210-211). This suggests that small stone bridges were feasible across narrow spans, but remained impractical for construction on a large scale.

Much of the bridge technology employed in the United States originated in Europe. The earliest truss bridge design is credited to Italian architect Palladio in 1570. In 1716 a publication entitled *Traite Des Ponts* was written by French engineer Henri Gautier. This was the first treatise dealing exclusively with bridge building, and was utilized extensively throughout the eighteenth century for designing both wood and stone bridges. In 1779 the first cast-iron bridge was constructed in Coalbrookdale, England. Nine years later,

Thomas Paine received an American patent for a cast-iron bridge with a longer span than ever attempted before. In 1823 the first iron railroad bridge was constructed in West Auckland.

Covered bridges, however, were common in America during the eighteenth and nineteenth centuries. Most of the patents for bridges issued during the early nineteenth century were for wooden-truss covered bridges (DeLony 1993:2-3). The covered structure that crossed the river at Raritan Landing during the nineteenth century (Figure 6) most likely represents either a completely new bridge or a superstructure added to the original eighteenth-century span.

The limits of colonial technology and the prohibitive cost also dictated the placement of bridges. Few spans were erected over New Jersey's larger rivers. There was no bridge over the Raritan at New Brunswick, although there were several upriver. The mouths of the Hackensack and Passaic rivers were not bridged, and Newark and New York were connected solely by ferry service (Lane 1939:47). Thus, even in areas where bridges were being built, ferry services continued to expand and prosper (Lane 1939:44). In spite of the erratic nature of colonial bridge building, several innovations did emerge that would have a profound effect on bridge design in later years. One was the appearance of the drawbridge, or "swinging bridge," a design which could be opened to allow the passage of boats and rafts. A second was the construction of "tall" bridges, which was likely aimed at the same objective (Lane 1939:47).

An examination of the Middlesex County Freeholder minutes from the years 1785 to 1840, showed bridge building and bridge repair to be common issues on the agenda. In addition to crossings near larger centers, such as New Brunswick and Raritan Landing, there are numerous references to smaller bridges spanning narrower brooks and creeks. Documentary evidence indicates that these smaller bridges were the financial responsibility of the landowner, not the county. In regard to the maintenance of both county and private bridges, a committee would be appointed by the freeholders to inspect bridges and determine if repairs were feasible, or if a new bridge should be built. The committee would then approve a price for the requisite work, and a person or persons to perform the repairs or construction (Middlesex Freeholders 1785-1840).

While New Brunswick and Raritan Landing throve as links in the British colonial system, Perth Amboy never lived up to its perceived potential. Merchant ships during the eighteenth century regularly bypassed the town, sailing further upriver to unload their cargoes. Visiting the town in 1736, Lewis Morris complained about the lack of growth:

> I wish I could Speake favorably of this place it is one of the Capitalls of this province to which the Sitting of the general Assembly is confined, it is pleasant in its Situation; has a healthy Air and a fine harbour; and back'd by a fine Country: but it is but very Little if any thing bigger than it was fifty years Agoe. The inhabitants are generally very poor and there is not Sufficient conveniency in it for the Entertainment of the Assembly. I yesterday told all the houses in the town Spot, and I could not reckon above one hundred taking in Stables Sheds and other out-houses. . . [quoted in Wacker 1975:312-315].

Perth Amboy's lack of success came in spite of attempts to make it a major focus of the regional transportation network. In 1684, two years before John Inian had been granted his ferry rights by the Proprietors, two different ferries had gone into operation at Perth Amboy (Figure 7). One ferry ran between Perth Amboy and Staten Island. A second ferry, known as the Long Ferry to distinguish it from the shorter run to Staten Island, plied the mouth of the Raritan between Perth Amboy and South Amboy (Pickersgill 1937:22). At South Amboy, travelers could take Lawrie's Road across the province to Burlington.

Although Lawrie's Road had been constructed in part to divert traffic from the Upper Road through Inian's Ferry (New Brunswick) and Woodbridge, traffic on the road was light compared to that on the popular route

FIGURE 6: Artist's Conception of the Landing Lane Bridge as It Appeared in 1766

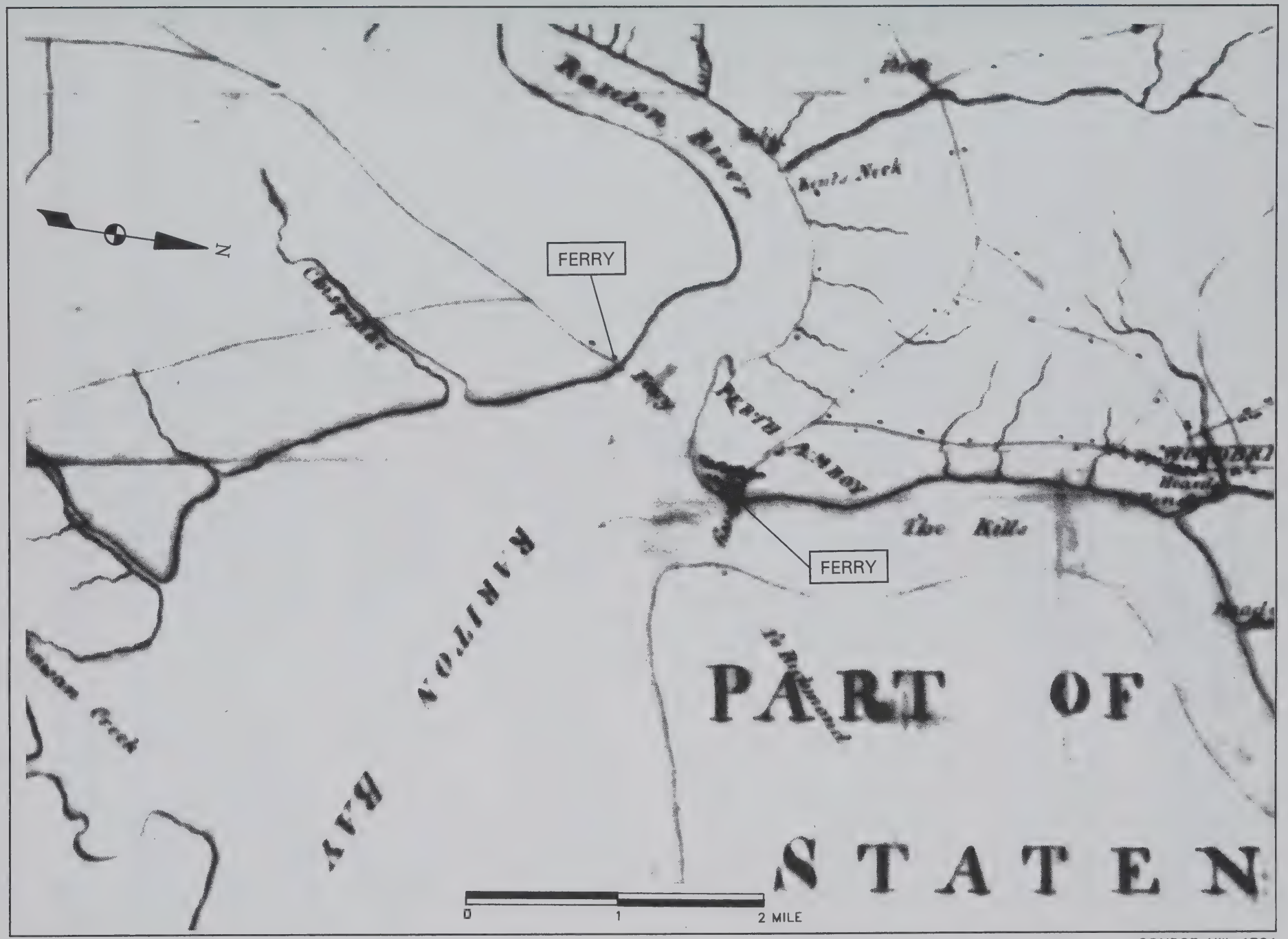


FIGURE 7: Ferry Crossings at Perth Amboy, circa 1781

SOURCE: Hills 1781

along the Old Dutch Road (Route 27). This was partly because Lawrie's Road ran through sparsely settled country; also, the sandy soils traversed by the road resulted in a poor roadbed (Lane 1939:42-43, 51). The Old Dutch Road, on the other hand, linked the growing towns of Elizabeth, New Brunswick, Princeton, and Trenton. It was the most direct route between New York and Philadelphia and had good accommodations for the intercolonial traveler (Lane 1939:51).

Despite the drawbacks inherent in Perth Amboy's location, and the comparative success of the Old Dutch Road route, ferry service would continue between Perth Amboy, South Amboy, and Staten Island well into the twentieth century. Indeed, service expanded to link the Amboys with Navesink to the south in 1701, when Arthur Stimson (also Simpson) was granted the right to operate a ferry between these points for fifteen years (Pickersgill 1937:19-20).

Government control over ferry activity was in effect from the middle of the seventeenth century. The Communipaw Ferry was licensed by the Dutch in 1661, and was re-certified in 1667 after New Jersey came under English rule. In 1669 Governor Carteret established regulations for the operation of the ferry. This mandate required the ferryman to keep his vessel ready at all times, but especially on three days a week, "unless some other occasion does hinder him" (Lane 1939:42). In 1684 the deputy governor established a ferry between Perth Amboy and New York for the express purpose of fostering trade and growth in the former. Another ferry, known as Redford's, was set up between Perth Amboy and South Amboy. This ferry, however, was underutilized in favor of the preferred connection at Inian's landing. John Inian received a patent in 1698 for the ferry he had been running for the previous twelve years. Other private ferries operated between Elizabethtown Point and New York, but were not included in the proprietary records of the East Jersey government, indicating that not all ferries were subject to state control. An example of the fees charged by the government is the yearly rental of five shillings assessed John Inian, along with free passage for the post and public messengers (Lane 1939:43).

Government regulation of ferries was further defined by the State Assembly in 1717 with the passage of an act for licensing and establishing the rates of ferriage. To deter price gouging, set rates were established for livestock and produce, with a provision included for fining ferryman should the rates be exceeded. The licensing of ferries was strictly enforced, and unlicensed were operators forced to cease operations. According to the Attorney General, "Ferries are a Franchise in the Crown, and no Person hath Authority to Erect a Ferry without having first obtained the Royal Grant" (Lane 1939:43-44).

Ferriage rates on the different rivers varied because of differences in the river's width or the difficulty of the crossing. The ferry between Perth Amboy and South Amboy charged six pence per person, one shilling for each horse, and one shilling for each wheel of a carriage. Ferriage rates between Staten Island and South Amboy were about double these. Rates on the Trenton Ferry were about half as much (Lane 1939:45).

Despite the tangle of state regulations, ferrymen were men of importance, and often earned considerable incomes. Many ferrymen operated taverns and stage lines in conjunction with their ferries, which also included substantial property. In areas with little or no competition, the multiservice ownership by a single individual occasionally led to unfair pricing and questionable business practices. In response to public discontent, an act was passed by the legislature in 1769 whereby all ferry operators were "required to give constant and diligent Attendance, and to keep their Boats and other Craft at all Times in Order . . . and not to deny or unnecessarily delay the speedy carrying over any Passenger or Passengers . . . upon the Penalty of forfeiting for every such Denial, Neglect or Delay the sum of twenty shillings" (cited in Lane 1939:45).

All manner of watercraft were used to ferry passengers and freight. Canoes were the earliest to be used, but had limited capacity. A scow or flatboat was long and narrow, with flat bottoms and vertical sides. A hinged

apron on either end was turned inboard while crossing and outboard at the landing. Ferries were usually poled across or had sails. On narrow rivers, ferries could be pulled across by ropes and pulleys. The wherry was a long, light rowboat, and still larger was the bateau, made of sawn lumber with tapering ends and a flat bottom. A skiff was a type of bateau about the size of a canoe. A special type of bateau, the Durham boat, was the type of vessel used by Washington to cross his army over the Delaware to surprise the Hessians near Trenton in 1776 (see below). Sloops were used to ferry passengers greater distances—such as between Elizabethtown Point and New York (Lane 1939:46).

C. TRAVEL BEFORE THE REVOLUTION

For eighteenth-century travelers, the trip between New York and Philadelphia could be quite arduous, particularly using an overland route, and those seeking to travel any distance often tried to go as far as possible by water. Most, however, would not have chosen to take a 30-hour rowboat trip between New York and Perth Amboy, as 17-year-old Benjamin Franklin did in 1723 on his way to Burlington (McGinnis 1958:55). The roads were uniformly dreadful, and in 1768, William Franklin (Benjamin Franklin's son), New Jersey's last royal governor, was quoted as saying, "Even those roads which lie between the two chief trading cities in America, are seldom passable without danger or difficulty" (Cawley and Cawley 1965:19). Overland travelers, unless riding their own horses, were forced to endure a jarring ride by stage over bad roads.

The earliest multipassenger/freight vehicle used on the stage lines was the Jersey wagon. Similar to farm wagons, it had enormous wheels and was pulled by four or six horses. A cloth top was the only protection afforded passengers against the elements. The Jersey wagons were gradually reduced in weight and size during the eighteenth century and developed into "stage wagons," vehicles indigenous to New Jersey. Coaches did not come into common use for stages in New Jersey until the eve of the American Revolution. The chariot, like the coach, had an enclosed body suspended on leather straps and had an elevated seat for the driver, but had only one bench for passengers. Still smaller were the chaise and the riding chair, which were pulled by only one horse. These small vehicles nearly supplanted horseback travel (Lane 1939:47-49).

A perhaps typical journey across New Jersey was recorded by the Swedish pastor and naturalist, Peter Kalm, who traveled to North America in 1749. He made the trip between Philadelphia and New York by taking the road along the west bank of the Delaware River and crossing at the Trenton Ferry. He reported that Trenton, a long narrow town of nearly 100 houses, relied chiefly on servicing the many travelers on this route between New York and Philadelphia. Entrepreneurs in Trenton controlled transportation between New Brunswick and Philadelphia, a journey which cost two shillings and sixpence, not including baggage. Most of the travelers made the trip between Trenton and Philadelphia by boat. The journey between Trenton and New Brunswick was usually made in an open wagon, which "came near shaking liver and lungs out of you." Both Trenton and Princeton were used for overnight stays. New Brunswick was described as "a pretty little town" extending along the southwest side of the Raritan River. At this location the river was deep enough for sailing vessels and was the width of "a common gun shot." Generally, the Raritan River flowed through steep banks, but New Brunswick was situated in a low valley and was directly accessible to the river, and therefore well suited for a ferry crossing.

From New Brunswick, Kalm chose to take Woodbridge Avenue eastward. At Fords, he had the choice of taking a road to Perth Amboy or continuing along the road which would eventually take him to the ferry at Paulus Hook (Jersey City). He chose the latter. The following summer, Kalm again made the journey between Philadelphia and New York. This time he sailed up the Delaware to Trenton, took a wagon to New Brunswick, and then boarded a ship for the remainder of the trip to New York. This route was, of course, much speedier than the overland route and only required one overnight stay in Trenton. The distance

between Trenton and New York was covered in about twelve hours (Kalm 1937:116-123, 322-324). The willingness to use multiple, connecting modes of transportation, including the torturous open wagon, suggests that speed was essential and mattered more than comfort to the eighteenth-century traveler (Lane 1939:77).

D. THE AMERICAN REVOLUTION

With the possible exception of South Carolina, New Jersey was the state most affected by events associated with the American Revolution, more engagements in the war being fought in New Jersey than in any other state. As it had with settlement, trade, and commerce, New Jersey's location between New York and Philadelphia would determine its fate in the war; and because the lower Raritan Valley lay athwart the principal north-south lines of communication, it would see its share of wartime activity.

In the fall of 1776, Lord Charles Cornwallis led British troops across New Jersey from New York City to Trenton. George Washington's army fell back from Newark to New Brunswick. Washington remained in New Brunswick from November 29 until December 1. His letters written from New Brunswick describe the enemy as constantly advancing, and by the evening of December 1 as on the "heights opposite Brunswic" (present-day Highland Park). Artillery under the command of Alexander Hamilton delayed the British from crossing the river into New Brunswick, giving Washington the opportunity to retreat through Kingston and then Princeton. The bridge at Raritan Landing was partly burned in an effort to delay the crossing of the river at that location by the British. The Continental army continued its retreat southward, crossing the Delaware River into Pennsylvania on December 7, 1776. Washington led his army back across the river on Christmas night to win a stunning victory over a Hessian garrison at Trenton (Durnin 1982:3-5; Middlekauf 1982:352-360).

The British were further embarrassed on January 2, 1777, when Washington defeated a brigade of English troops just south of Princeton. Following its victory, the American army continued on the road from Princeton toward New Brunswick (now Route 27). At Kingston, they destroyed the bridge over the Millstone River. Washington realized, however, that his men were too exhausted to mount an assault on the British supply depot at New Brunswick and set off instead for winter camps near Morristown. Cornwallis, thinking that Washington would head for New Brunswick, led his army there in futile pursuit.

Perth Amboy was a city divided in its loyalties. In the summer of 1776, about 6,000 American soldiers filled the town, using St. Peter's Church as a barracks. Earthworks were constructed and war ships stationed around the point (Sandy Point) (McGinnis 1958:49). After the Americans departed in November (part of the general retreat from central New Jersey), the town was occupied by the British through the winter of 1776-1777. The British army was divided between New Brunswick and Perth Amboy. Short of provisions, the British sent foraging parties out from both towns into the surrounding countryside, where they were continually harassed by American militia. On at least one occasion, the British attempted, unsuccessfully, to supply the garrison at New Brunswick by running a fleet of boats upriver.

In the early summer of 1777, Howe had shifted his forces to concentrate against Philadelphia, thinking that the capture of the American capital would bring the war to a close. British forces evacuated Perth Amboy by ship on June 30, 1777, with many of the town's loyalist families leaving with them. Perth Amboy was never again garrisoned by the British, but it had been hard hit by the occupation, which had caused many of its citizens to move away and much of its commerce to be drawn off (McGinnis 1958:47-48). New Brunswick and Raritan Landing were abandoned by the Crown's forces at about the same time; much of Raritan Landing was burned during the evacuation, a disaster from which the town never fully recovered.

In June 1778 the British army under Sir Henry Clinton evacuated Philadelphia, returning to its main base in New York via New Jersey. Washington followed, passing through Hopewell and Cranbury. Washington pursued and overtook Clinton at Monmouth Court House (near Freehold) on June 28, where the two armies fought to a draw. The night following the battle, the British continued to retire in the direction of New York. The American army traveled through the July heat to the Raritan River in Piscataway Township, where they camped on both sides of the river near the present Johnson Park, and in New Brunswick, where Rutgers University is now located. Washington's army crossed Landing Lane Bridge and celebrated the 4th of July in New Brunswick (Durnin 1982:7; Middlekauf 1982:424-428).

Monmouth proved to be the last major battle of the Revolution fought in New Jersey. The military situation in the northern states soon evolved into a stalemate, with the British safely ensconced in New York and the Continental Army and local militias keeping a wary eye on the enemy. In 1779 the British began to direct their attention to pacifying the southern colonies. The rural countryside of New Jersey, including the lower Raritan Valley, however, was still subject to raids and skirmishes as the British continued to forage for supplies in New Jersey or tried to draw Washington into open battle. Forces of the English Crown remained in New York City until 1783. The final peace treaty (the preliminary treaty had been signed in Paris in 1782) was signed on September 3, 1783; less than two months later, on November 25, the British evacuated New York City.

III. FROM THE EARLY REPUBLIC TO THE TURN OF THE TWENTIETH CENTURY

III. FROM THE EARLY REPUBLIC TO THE TURN OF THE TWENTIETH CENTURY

A. INTRODUCTION

The roughly 120 years between the end of the American Revolution and the beginning of the twentieth century was a period of startling changes in American life. The size of the country born of the War for Independence would expand manyfold during that time, stretching from Maine to Florida, and from New York to California, and by the end of the nineteenth century, the United States would join its European contemporaries in acquiring overseas territories. At home, Americans would fight a civil war that would cost over 600,000 lives, maintain the Union, and put an end to the "peculiar institution" of slavery. Despite wars and frequent outbreaks of infectious diseases, such as cholera, typhus, and typhoid fever, the American population would continue to expand, through natural increase and through a flood of immigration that intensified to unprecedented levels beginning in the 1840s and 1850s. More and more people were living in cities, particularly in the Northeast, and the urban population would be the first to experience the effects of the market and industrial revolutions.

The transformation of American urban life was exemplified by the division of labor, the separation of home and workplace, and the rise of the middle class with its attendant ideology of the separation of men's and women's spheres and the cult of domesticity (Blumin 1976, 1989; Bushman 1992; Gordon 1978; Kasson 1990; Matthai 1982; Rock 1979; Sellers 1991). In the countryside, the expansion of market capitalism over the course of the 1800s altered, sometimes radically, the relations of property, class, generation, and gender, giving rise to what historians have termed the "great transformation" (Clark 1990; Gross 1988). The rural economy experienced a marked shift from a "subsistence-surplus" agriculture to specialized production for urban markets. The demand by rural folk, together with their urban counterparts, for inexpensive yet refined goods helped spur the industrial revolution in America (Bushman 1992), and without the revolution in the countryside, the creation of an urban industrial society would have been impossible (Gross 1988).

The growing industrial economy was spurred on by the creation of a national system of transportation, first on the roads and rivers (and canals), and subsequently on the railroads. Travel and the movement of goods and information were strikingly speeded up (Larkin 1988). The movement west, given a boost by the completion of the first transcontinental railroad, would hit its stride during the second half of the nineteenth century (Sutherland 1989). By the 1890s, four railroads stretched across the country, and by the turn of the century, railroads had become the nation's largest business. Railroads would reshape the American-built environment and would reorient American behavior. Development of the streetcar (first the horsecar and later the electric trolley) would similarly change the way Americans lived and traveled. Streetcars encouraged urban expansion and the construction of homes at greater and greater distances from downtown areas. By the 1870s streetcar suburbs had developed outside many American cities (Schlereth 1991).

Yet, outside the cities and suburbs, people traveled on foot or by horse or mule. Farmers still moved their goods in wagons, but the roads, particularly between the major cities, were dominated by heavy freight wagons pulled by four, six, or sometimes eight horses. Making 25 or 30 miles a day, if they were lucky, teamsters plying the busier thoroughfares would often stop at taverns that "specialized in strong drink and rough-and-ready hospitality—and which stage passengers and other more genteel travelers avoided" (Larkin 1988:219-220). The stagecoach remained the most common way for Americans to travel long distances well into the nineteenth century. Although coach design had improved markedly over the "stage waggons" of the eighteenth century, travel by stagecoach remained crowded and generally uncomfortable. For travel over

shorter distances, middling and well-to-do individuals went by two-wheeled, one-horse chaises or gigs, or four-wheeled, two-horse carriages.

Although streetcars did not cross the Raritan River, they did play an integral role in the growing urbanization of New Jersey in the late nineteenth century. The first tracks for horse-drawn trolleys were laid in 1884 in New Brunswick, along Somerset Street, Commercial Avenue, Sandford Street, Throop Avenue, and George Street. These tracks were purchased by the Brunswick Traction Company and were electrified in 1895 (Regan 1996:113). Electric trolleys were first introduced in New Jersey during the 1880s, mainly in urban areas, such as Newark, Paterson, Camden, Clifton, and Atlantic City (Cunningham 1966:243-244). The new electric trolleys, which replaced the earlier, horse-drawn streetcars, gave urban residents a mobility previously unknown. Between 1890 and World War I, trolleys served the demands of every facet of American life, including work, shopping, and recreation. Initial fears of "clanking monsters run by lightning" eventually subsided, as the speed, convenience, and comfort offered by the trolleys captured the imagination of the New Jersey commuter. Although most of the trolley service was limited to urban areas, long-distance travel was also offered on certain routes. One popular vacation line was a 267-mile run between New York and Boston. This excursion took slightly more than 18 hours in actual travel time, at a cost of $3.75 (Cranmer 1964:83).

In an attempt to entice residents to patronize the "new" trolley service, free rides were offered in Atlantic City to anyone willing to ride the trolley on opening day in 1889. By 1890, intertown service was initiated between Passaic, Garfield, and Clifton. Trolleys were also instrumental in expanding populations into the suburbs adjacent to the major urban centers. Thus, the influence of the trolley was twofold: it brought workers from the suburbs to work in the city during the week, and carried urban crowds to the country on Sundays (Cunningham 1966:244-245).

The impact of the electric trolley on transportation began to wane during the 1920s. The coming of the gas-powered motorbus would eventually replace the trolley for the same reasons that the trolley had replaced the horse-drawn streetcar nearly forty years earlier: lower costs and more efficient operation (Cranmer 1964:84). Although trolley service continued in some areas until World War II, it was clear that the increasingly popular automobile was the predominant mode of transportation in New Jersey during the middle of the twentieth century.

As Larkin (1988) has observed, Americans at the beginning of the nineteenth century still lived "in a world of small scale and scarcity. People, goods, and information moved slowly. The tools they used and the routines of their work, their materials and sources of power, would have been immediately recognizable to a man or woman of the seventeenth century" (Larkin 1988:xv). By the end of the nineteenth century, however, that familiar world had long since disappeared.

B. POPULATION

In the 50 years between 1790 (the year of the first U.S. census) and 1840, the population of New Jersey had more than doubled, from 184,139 to 373,306. The statewide growth rate dropped to a low level of 15 per 1,000 during this period, resulting from net emigration at a time when natural increase was at a high level. The loss of persons born in New Jersey coincides with the early nineteenth-century movement of settlers from the eastern seaboard to the western frontier. During this period, the rate of growth in Middlesex County consistently lagged behind that of the state, and the only area that showed a rate of population growth in excess of the state as a whole were the northeastern counties, where the pace of urbanization had begun to quicken in cities such as Paterson and Newark. In contrast to Middlesex County, Monmouth County showed a rate of population increase that was consistent with the growth of the state, and during these years the

actual population of Monmouth County (which at the time included the area that was to become Ocean County) exceeded the population of Middlesex County.

Between 1840 and 1900, the population of New Jersey grew by more than 400 percent, reflecting the increasingly urban-industrial character of the state. The statewide growth rate during this period averaged 27 per 1,000, reflecting migration rates that were higher than the natural increases. While the rate of population growth also increased dramatically in Middlesex County after 1840, population growth of the state as a whole, as well as several neighboring counties, continued to outpace Middlesex County. Between 1840 and 1900, the population of Middlesex County increased from 21,893 to 79,762, an increase of approximately 264 percent. But by 1900, the population of Middlesex County remained less than the surrounding counties of Monmouth, Mercer, and Union. During the period from 1800 to 1900, the percent of the state's population residing in Middlesex County showed a steady decline, from approximately 8.5 percent in 1800 to 4.2 percent in 1900, underscoring the fact that other areas of the state were growing faster than Middlesex County during this period. The population and rate of population growth of selected counties during the period 1800 to 1900 are shown in Figure 8 and in Table 2.

During the latter half of the nineteenth century, the population of the urban centers of New Jersey dramatically increased as the industrial revolution gathered momentum and supported further immigration from Europe. By 1880, New Jersey's population passed the one million mark, and roughly 54 percent were living in urban areas. Between 1840 and 1900, population growth in the cities of Camden, Elizabeth, Jersey City, Newark, Paterson, Perth Amboy, and Trenton consistently outpaced the statewide growth rate. In contrast, the rate of population growth of New Brunswick consistently lagged behind that of the state. This development pattern highlights the fact that during this time the major centers of growth in New Jersey were linked to the economic centers and ports of New York and Philadelphia, and while New Brunswick occupied a strategic location on the Raritan River along the major route between these two centers, the city did not prosper to the same extent as other urban areas of New Jersey. The population of selected cities during the period 1810 to 1900 is shown in Table 3.

C. ECONOMIC ACTIVITY

Between 1840 and 1900, the total capital invested in manufacturing in New Jersey practically doubled every 10 years, from a total of approximately $11.5 million in 1840 to approximately $502.8 million in 1900. In 1840, capital investment was concentrated in Essex County ($3.2 million) and Passaic County ($1.9 million), corresponding to the urban centers of Newark and Paterson, respectively. The dominance of these two centers continued until 1880, when Hudson County (Jersey City) surpassed Passaic County. Hudson County became the leader in capital investment in manufacturing in 1900, surpassing Essex County for the first time.

In 1840 capital invested in manufacturing in Middlesex County totaled approximately $0.4 million, approximately 3.8 percent of the statewide total of $11.5 million. By 1900 capital invested in Middlesex County for manufacturing had climbed to approximately $26.4 million, but was still only 5.3 percent of the statewide total of $502.8 million. In contrast, capital investment in Essex County in 1840 equaled nearly 28 percent of the statewide total, and in 1900 capital investment in Hudson County also equaled nearly 28 percent of the total statewide. Table 4 shows total capital invested in manufacturing for selected counties.

Between 1850 and 1900, Middlesex County, outside of the urban areas of New Brunswick and Perth Amboy, remained primarily rural, with the number of acres of improved land in farms increasing slightly from approximately 115,900 acres in 1850 to a peak of 129,300 acres in 1900. With the exception of Union County to the north, the counties surrounding Middlesex added more acres of farmland during this same period, as shown in Table 5.

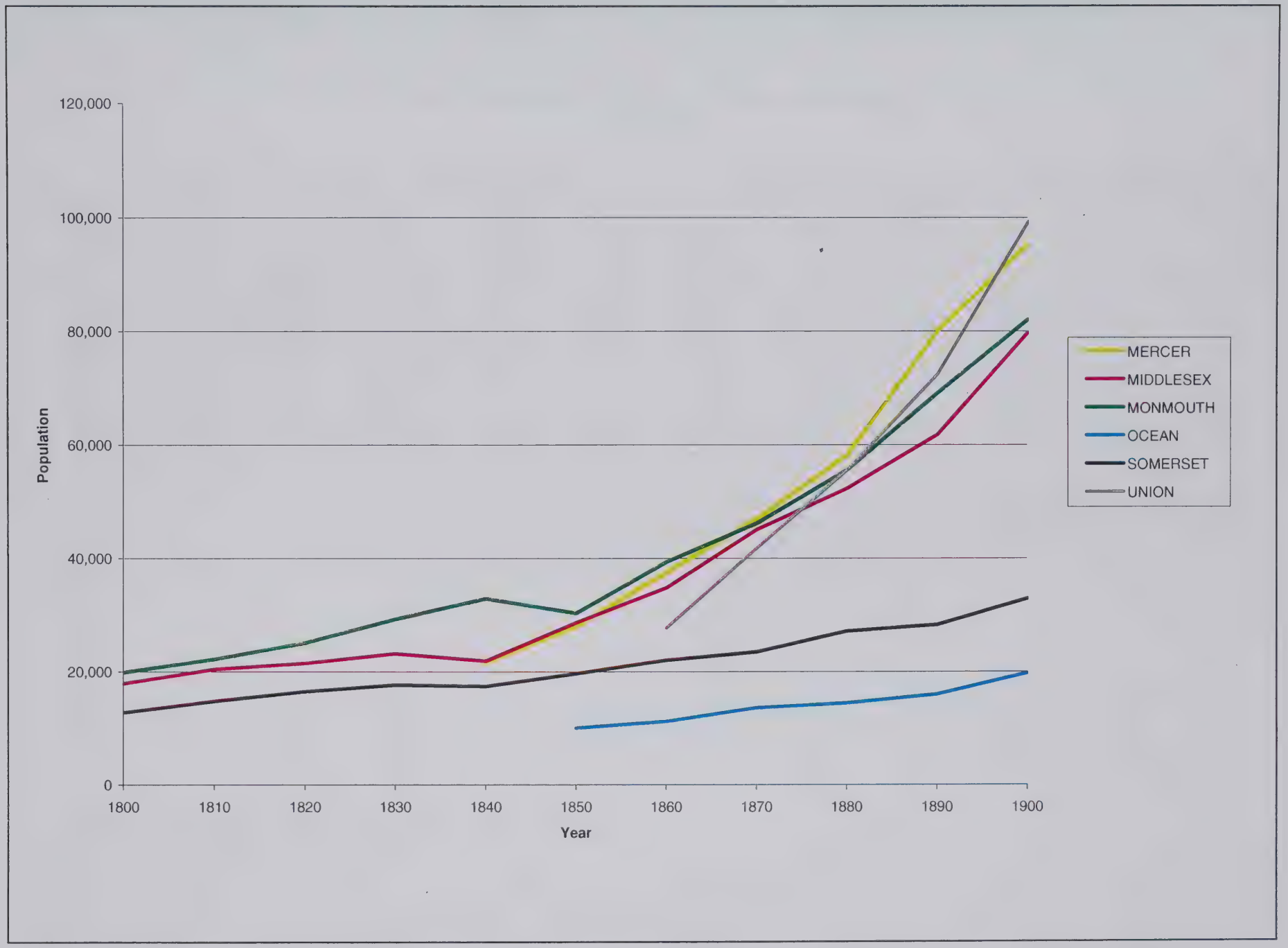


FIGURE 8: County Population, 1800-1900

SOURCE: U.S. Bureau of the Census

Table 2: Population in New Jersey and Selected Counties 1800-1900

Year	New Jersey		Middlesex County			Monmouth County			Mercer County (1)		
	Population	% Growth	Population	% Growth	% of State	Population	% Growth	% of State	Population	% Growth	% of State
1800	211,149		17,890		8.5%	19,872		9.4%			
1810	245,562	16.3%	20,381	13.9%	8.3%	22,150	11.5%	9.0%			
1820	277,575	13.0%	21,470	5.3%	7.7%	25,038	13.0%	9.0%			
1830	320,823	15.6%	23,157	7.9%	7.2%	29,233	16.8%	9.1%			
1840	373,306	16.4%	21,893	-5.5%	5.9%	32,909	12.6%	8.8%	21,502		5.8%
1850	489,555	31.1%	28,635	30.8%	5.8%	30,313	-7.9%	6.2%	27,992	30.2%	5.7%
1860	672,035	37.3%	34,812	21.6%	5.2%	39,346	29.8%	5.9%	37,419	33.7%	5.6%
1870	906,096	34.8%	45,029	29.3%	5.0%	46,195	17.4%	5.1%	46,963	25.5%	5.2%
1880	1,131,116	24.8%	52,286	16.1%	4.6%	55,538	20.2%	4.9%	58,061	23.6%	5.1%
1890	1,444,933	27.7%	61,754	18.1%	4.3%	69,128	24.5%	4.8%	79,978	37.7%	5.5%
1900	1,883,669	30.4%	79,762	29.2%	4.2%	82,057	18.7%	4.4%	95,365	19.2%	5.1%

Year	Ocean County (2)			Somerset County			Union County (3)		
	Population	% Growth	% of State	Population	% Growth	% of State	Population	% Growth	% of State
1800				12,815		6.1%			
1810				14,825	15.7%	6.0%			
1820				16,506	11.3%	5.9%			
1830				17,689	7.2%	5.5%			
1840				17,455	-1.3%	4.7%			
1850	10,032		2.0%	19,692	12.8%	4.0%			
1860	11,176	11.4%	1.7%	22,057	12.0%	3.3%	27,780		
1870	13,628	21.9%	1.5%	23,510	6.6%	2.6%	41,859	50.7%	4.6%
1880	14,455	6.1%	1.3%	27,162	15.5%	2.4%	55,571	32.8%	4.9%
1890	15,974	10.5%	1.1%	28,311	4.2%	2.0%	72,467	30.4%	5.0%
1900	19,747	23.6%	1.0%	32,948	16.4%	1.7%	99,353	37.1%	5.3%

(1) Mercer County was formed from parts of Burlington, Hunterdon and Middlesex Counties

(2) Ocean County was originally part of Monmouth County

(3) Union County was originally part of Essex County

Source: U.S. Census

Table 3: Population in New Jersey and Selected Cities 1800-1990

Year	New Jersey Population	% Growth	Camden Population	% Growth	Elizabeth Population	% Growth
1800	211,149					
1810	245,562	16.3%			2,977	
1820	277,575	13.0%			3,515	18.1%
1830	320,823	15.6%			3,455	-1.7%
1840	373,306	16.4%	3,371		4,184	**21.1%**
1850	489,555	31.1%	9,479	**181.2%**	5,583	**33.4%**
1860	672,035	37.3%	14,358	**51.5%**	11,567	**107.2%**
1870	906,096	34.8%	20,045	**39.6%**	20,832	**80.1%**
1880	1,131,116	24.8%	41,659	**107.8%**	28,229	**35.5%**
1890	1,444,933	27.7%	58,313	**40.0%**	37,764	**33.8%**
1900	1,883,669	30.4%	75,935	30.2%	52,130	**38.0%**
1910	2,537,167	34.7%	94,538	24.5%	73,409	**40.8%**
1920	3,155,900	24.4%	116,309	23.0%	95,783	**30.5%**
1930	4,041,334	28.1%	118,700	2.1%	114,589	19.6%
1940	4,160,165	2.9%	117,536	-1.0%	109,912	-4.1%
1950	4,835,329	16.2%	124,555	6.0%	112,817	2.6%
1960	6,066,782	25.5%	117,159	-5.9%	107,698	-4.5%
1970	7,168,148	18.2%	102,551	-12.5%	112,654	4.6%
1980	7,364,823	2.7%	84,910	-17.2%	106,201	-5.7%
1990	7,730,188	5.0%	87,492	3.0%	110,002	3.6%

Year	Jersey City Population	% Growth	Newark Population	% Growth	New Brunswick Population	% Growth
1830			10,953			
1840	3,072		17,290	**57.9%**		
1850	6,856	**123.2%**	38,894	**125.0%**		
1860	29,226	**326.3%**	71,941	**85.0%**	11,256	
1870	82,546	**182.4%**	105,059	**46.0%**	15,058	33.8%
1880	120,722	**46.2%**	136,508	**29.9%**	17,166	14.0%
1890	163,003	**35.0%**	181,830	**33.2%**	18,603	8.4%
1900	206,433	26.6%	246,070	**35.3%**	20,006	7.5%
1910	267,779	29.7%	347,469	**41.2%**	23,388	16.9%
1920	298,103	11.3%	414,524	19.3%	32,779	**40.2%**
1930	316,715	6.2%	442,337	6.7%	34,555	5.4%
1940	301,173	-4.9%	429,760	-2.8%	33,180	-4.0%
1950	299,017	-0.7%	438,776	2.1%	38,811	**17.0%**
1960	276,101	-7.7%	405,220	-7.6%	40,139	3.4%
1970	260,545	-5.6%	382,417	-5.6%	41,885	4.3%
1980	223,532	-14.2%	329,248	-13.9%	41,442	-1.1%
1990	228,537	2.2%	275,221	-16.4%	41,711	0.6%

Year	Paterson Population	% Growth	Perth Amboy Population	% Growth	Trenton Population	% Growth
1810					3,002	
1820					3,942	31.3%
1830					3,925	-0.4%
1840	7,596				4,035	2.8%
1850	11,334	**49.2%**	1,865		6,461	**60.1%**
1860	19,586	**72.8%**	2,302	23.4%	17,228	**166.6%**
1870	33,579	**71.4%**	2,861	24.3%	22,874	32.8%
1880	51,031	**52.0%**	4,808	**68.1%**	29,910	**30.8%**
1890	78,347	**53.5%**	9,512	**97.8%**	57,458	**92.1%**
1900	105,171	**34.2%**	17,699	**86.1%**	73,307	27.6%
1910	125,600	19.4%	32,121	**81.5%**	96,815	32.1%
1920	135,875	8.2%	41,707	**29.8%**	119,289	23.2%
1930	138,513	1.9%	43,516	4.3%	123,356	3.4%
1940	139,656	0.8%	41,242	-5.2%	124,697	1.1%
1950	139,336	-0.2%	41,330	0.2%	128,009	2.7%
1960	143,663	3.1%	38,007	-8.0%	114,167	-10.8%
1970	144,824	0.8%	38,798	2.1%	104,638	-8.3%
1980	137,970	-4.7%	38,951	0.4%	92,124	-12.0%
1990	140,891	2.1%	41,967	7.7%	88,675	-3.7%

Source: U.S. Census

Table 4: Total Capital Invested in Manufacturing in New Jersey and Selected Counties 1840-1900

	1840	1850	1860	1870	1880	1890	1900
Essex	$3,170,568	$6,076,092	$13,846,605	$22,606,662	$28,817,405	$68,305,003	$117,167,724
Hudson	$411,850	$1,082,300	$3,345,690	$11,718,400	$15,366,125	$52,694,445	$140,603,456
Mercer	$997,355	$1,133,445	$2,581,880	$5,022,782	$7,952,795	$20,761,890	$27,766,696
Middlesex	$441,900	$1,139,450	$2,331,250	$4,231,320	$4,943,270	$6,047,827	$26,390,004
Passaic	$1,931,970	$2,993,850	$3,442,018	$8,176,400	$14,378,492	$32,631,721	$70,349,231
Union			$1,713,425	$3,570,450	$3,813,665	$12,902,155	$25,850,924
Statewide Total	$11,517,582	$22,184,730	$40,521,048	$79,606,719	$106,226,593	$250,805,745	$502,824,082

Source: U.S. Census

Table 5: Total Number of Acres of Improved Land in Farms
1850-1950 (1)

	1850	1860	1870	1890	1900	1920	1930	1940	1950
Mercer	95,380	107,591	108,400	195,566	132,761	88,416	93,081	85,125	79,979
Middlesex	115,938	106,206	115,621	125,324	129,325	70,318	68,062	63,732	67,020
Monmouth	145,739	138,081	156,777	199,880	197,366	132,037	154,400	161,024	146,234
Ocean	26,466	37,746	23,653	54,960	84,820	23,768	30,303	34,514	41,366
Somerset	137,700	152,899	157,276	174,494	167,604	113,021	99,130	107,630	97,582
Union		56,154	27,349	25,532	29,050	10,352	6,527	4,219	5,292
Statewide Total	1,767,991	1,944,441	1,976,474	2,661,245	2,841,080	1,555,607	1,758,027	1,874,388	1,725,441

(1) Comparable data was not available for 1880 and 1910

Source: U.S. Census

Raritan Landing, and to a somewhat lesser degree New Brunswick, dwindled in importance as centers of coastwise traffic after the American Revolution (Wildes 1943:103). New Brunswick survived the hostilities of the Revolution, and by the early nineteenth century was still an active port for commerce in grain. Raritan Landing, on the other hand, had suffered more heavily, in proportion, than had New Brunswick, and never recovered its prominent position in Raritan River trade (see page 20). From the earliest days of the settlement, Raritan Landing had lagged behind New Brunswick in both stature and prosperity. Its location two miles above New Brunswick limited its potential for shipping and trade. Only during high tide were sloops able to navigate the river as far as Raritan Landing. Even a bridge built across the river failed to draw traffic from the busy Inian's Ferry down river. Shipping to and from Raritan Landing was further impeded by a dam, which provided power for several local gristmills, while decreasing the depth of the water and halting flatboats from the interior (Wildes 1943:62-63).

By 1830 New Brunswick was a bustling town of over 5,000 people, and was developing into a major river port through the establishment of steamboat docking facilities, as well as a nexus of road and river transportation. Beginning in the 1830s, the D&R Canal linked New Brunswick to the Delaware River, and therefore to the cities of Trenton and Philadelphia and the coal fields of Pennsylvania. The canal had its eastern terminus at New Brunswick and possessed facilities for transferring freight from canal barges to river and ocean-going vessels. The canal also provided a fine source of easily controlled water power, allowing the development of large-scale industry in New Brunswick. Although it never achieved the industrial prominence of Newark or Trenton, the city quickly became one of the state's leading manufacturing centers, particularly for wallpaper and rubber goods. The first rubber plant in New Brunswick was established by Horace H. Day in 1839, and by the Civil War, New Brunswick's rubber factories were producing millions of boots, rubbers, buttons, and "arctic" overshoes. By the 1880s, the Johnson brothers had established their gauze and adhesive tape plant in the city. The coming of railroad service to New Brunswick further stimulated the city's development, and New Brunswick by the mid-nineteenth century was one of New Jersey's largest and most important urban centers. Surrounding areas remained agricultural, but the developments in New Brunswick had effects throughout the valley. Among these effects were the spread of industry to other areas of the valley—to communities such as Milltown—and the process of suburbanization, felt most profoundly in the areas immediately adjacent to the city (Berger 1983:30).

The eastern portion of the lower Raritan Valley also experienced significant industrial expansion during the nineteenth century. The sandy soils which in earlier times had inhibited the region's agricultural growth were found to be an exploitable resource. The deposits of clay that underlie these sandy soils were found to be of even greater value. The mining of clay for firebrick, common brick, and pottery, and later, the mining of sand, became the major economic activities in this area, and the river transport network was adapted to serve these industries. Along the southern part of the lower Raritan Valley, agricultural pursuits continued, but they were greatly overshadowed by these new activities.

Clay deposits from the Raritan Valley had been exploited as early as 1800, when clay from South Amboy was used in the manufacture of stoneware pottery at Old Bridge. In 1802 a stoneware pottery was begun at "Roundabout" (now Sayreville). By the 1830s, the clay industry had expanded significantly with the establishment of a number of brick manufacturing concerns. The first brick plant in the Raritan Valley clay district was established by John R. Watson in 1836 in Perth Amboy. In 1851 a firebrick plant had been set up at Roundabout. In the same year, Peter Fisher and James Sayre bought a 23-acre tract at Roundabout and began the manufacture of common bricks. The Sayre and Fisher Company became the largest individual brick-making plant in the world. Clay was mined in the Sayreville area and the finished products were shipped from Sayre and Fisher's docks on the Raritan River to New York (Staniford 1925:49). By 1878, eight brickyards along the lower Raritan were producing 54 million bricks, with Sayre and Fisher turning out the largest number by far (Cunningham 1994:136). Woodbridge, South Amboy, and Perth Amboy

remained the center of firebrick manufacture, and New Jersey ranked second to Pennsylvania in clay extraction for the entire United States (Staniford 1925:49).

The manufacture of architectural terra cotta began in America at Perth Amboy in the 1840s. In 1845, Alfred Hall had located in Perth Amboy to make firebrick. Four years later he had started an extensive terra cotta plant. Others followed Hall's example, and Perth Amboy and the surrounding area became the center of terra cotta production for the entire globe (Cunningham 1994:136). Hollow clay bricks used for fireproofing purposes became another important product produced along the Raritan River. As a result of the upsurge in brick and terra cotta manufacture, Perth Amboy experienced an economic revival during the mid- to late nineteenth century, a resurgence that was further stimulated when the Lehigh Valley Railroad extended its line to the city in 1876. Perth Amboy became the Lehigh Valley's tidewater terminus, and was transformed from a sleepy resort town into a bustling industrial center. Within ten years, from 1870 to 1880, the population of Perth Amboy more than doubled. Along with the brick and terra cotta plants, chemical plants (Roessler & Hasslacher Chemical Company), copper smelting plants (Raritan Copper Works), marine engine manufacturers (like the Shantz and Eckert Machine Works, which built some of the machinery for the *Holland*, the U.S. Navy's first submarine), and boat builders (such as the Perth Amboy Dry Dock Company, which manufactured and repaired tugboats, barges, and carfloats) were established in Perth Amboy during the late nineteenth century.

The rise of heavy industry along the lower Raritan had a deleterious effect on one of the region's oldest economic mainstays—oystering. Oyster fishing had, in fact, undergone a series of boom and bust cycles during the eighteenth and early nineteenth centuries. For example, the combination of over-harvesting and increased silting (a result of runoff from agricultural land) nearly depleted the natural oyster beds by the early nineteenth century. New Jersey and Staten Island oyster fishermen vied for control over the dwindling oyster supply. This antagonism was probably responsible for a decline in ferry traffic between Perth Amboy and Tottenville, Staten Island, where the oyster industry was the economic mainstay (MacKenzie 1992:24-26).

The increasing population of New York City and other urban areas meant an increasing demand for oysters. In 1825, to satisfy the market, local fishermen began importing partially grown oysters, referred to as "seed oysters," from the Chesapeake Bay, New England, Long Island Sound, Delaware Bay, and locally from the Arthur Kill, Rahway River, Cheesequake Creek, and Newark Bay. The oysters grew well and the harvest was primarily marketed in New York City. Later, specially designed railroad cars with double walls to preserve cool temperatures would enable export of the oysters to the western United States, as well as to the summer resorts along the New Jersey shore (MacKenzie 1992:66-68). Demand for oysters in the Jersey shore resort area increased exponentially in the late nineteenth century, as railroad service allowed millions of vacationers and "daytrippers" to visit the bucolic shore region (Cunningham 1966:240-241).

The Civil War had a major effect on the Raritan Bay oyster industry because the main source of seed oysters was the Chesapeake Bay region. Many oystermen attempted to continue their business in southern waters, usually with bad results. During the war, seed oysters were imported from New England, but directly after the cessation of fighting, three-quarters of Raritan Bay's seed oysters were again imported from Chesapeake Bay (MacKenzie 1992:69-70). Following a resurgence after the war, oyster harvests, together with fish catches, began to drop as more and more pollutants entered the Raritan River. The twentieth century would see the near demise of the oyster industry.

D. TRANSPORTATION

1. Roads

New Jersey's roads, in the decades following the American Revolution, would undergo a gradual improvement. Roadways would be crowned, allowing water to flow into ditches running parallel to the thoroughfare, and new methods of paving would be applied. Yet, the stretch between New York and Philadelphia would continue to be referred to by teamsters as the "Jersey swamp," because of the slow pace of movement through the area during inclement weather. Until rail and canal transportation became available in the 1830s, travel in the corridor between New York and Philadelphia was, of necessity, by road. The experience was almost certainly uncomfortable, and was memorable enough for a number of individuals to record their impressions.

In 1785 a young London gentleman recounted his journey by the fast stage from New York City to Philadelphia. The journey began with a 15-minute sail across the Hudson River to Paulus Hook (Jersey City) where a stagecoach awaited the passengers willing to pay $6 for the fare. Less affluent passengers took the stage wagon for $4, which jolted along behind the coach with the baggage. Both the Hackensack and Passaic rivers were crossed by ferries. After a short rest stop in Newark, the travelers ended the first stage of their journey in Elizabeth, two and a half hours after leaving New York. By 4:30 the following morning the stage was again underway. Four horses pulled the stage along at nine or ten miles an hour. Stopping at Woodbridge to change horses and take on passengers, the stage sped on the remaining ten miles to New Brunswick, arriving at 8:30 a.m. for breakfast. Fresh horses in New Brunswick and Princeton allowed the stage to reach Trenton by 1:00 p.m. As the Upper Road stage was nearing the ferry over the Delaware River, it met the rival stage line which followed a route from across Staten Island, crossing with the Tottenville ferry to Perth Amboy and then taking the Amboy-Trenton Road. The horses sped up to a gallop as the stagecoach drivers vied for first place at the ferry crossing. Once on the opposite side, the stage proceeded along the river on a road like a "bowling green," stopping for dinner at Bristol before arriving at 6:30 p.m. in Philadelphia (Studley 1964:47-52).

Ten years later, in June 1795, a young Irish gentleman named Isaac Weld made the same journey in the opposite direction. Beginning at Philadelphia, he and two companions hired a carriage to take them all the way to Canada. They crossed the Delaware River at Trenton and took the Upper Road through Princeton to New Brunswick. This latter town with about 200 houses had "nothing deserving of attention in it, excepting . . . the very neat and commodious wooden bridge that has been thrown across the Raritan River." The drawbridge had a passage on either side for foot traffic with guard rails and lamps. After passing through Elizabeth and Newark, the party entered the Meadowlands where they were plagued by mosquitoes. A wooden bridge, described as similar to the one built over the Raritan River at New Brunswick, had been built across the Passaic River. The travelers continued on to the Hudson River, presumably crossing at Paulus Hook. The peripatetic Irishman had a much different experience when he made the journey from Philadelphia to New York again in the winter of 1796. A thick crust of ice, not strong enough to support a carriage, covered the Delaware River at the Trenton ferry. A passage was cleared through the ice for the ferry boat while the frigid passengers waited. Isaac Weld remarked that although sleighs were the safest and fastest of conveyances in these weather conditions, travelers in the Middle Atlantic states avoided their use because of the frequent and rapid thaws which would strand them on a long journey (Studley 1964:57-63).

Julian Ursyn Niemcewicz, a Polish nobleman, traveled to North America for the first time in 1797 in the company of Tadeusz Kosciuszko, settling temporarily in Philadelphia. They visited with Kosciuszko's old comrades from the American Revolution who resided in New Brunswick and New York City. Kosciuszko returned to Europe the following year, but Niemcewicz remained in America another ten years, settling in

Elizabeth, New Jersey. In August 1797, Kosciuszko and Niemcewicz, like so many others, had fled from the yellow fever epidemic in Philadelphia. They took a carriage along the west bank of the Delaware River, crossing at Trenton, and continuing along the future Route 206/Route 27 by carriage until stopping for the night at Kingston (Niemcewicz 1965:4-7). The next morning they arrived at New Brunswick, where they stayed at the home of General Anthony Walton White. Niemcewicz described the Raritan River at New Brunswick as navigable for boats of 60 tons. It flowed through a well-populated and fertile district (Niemcewicz 1965:7). Niemcewicz described the bridge crossing the Raritan at New Brunswick as "magnificent" (Niemcewicz 1965:32). On the way to General Horatio Gates's house in New York, they passed through the towns of Springfield, Elizabeth, and Newark. They crossed over the Hudson River in a sailboat at Hoboken (Niemcewicz 1965:12).

Niemcewicz traveled by stagecoach from New Brunswick to Philadelphia in November 1797. The stagecoach was a large covered carriage with leather curtains at the side which could be raised or lowered. Three or four benches served as seats for the passengers. The carriage and horses were changed every 10, 15, or 20 miles. One of the major drawbacks of stagecoach travel was that the passengers were at the mercy of the stagecoach driver, who determined where to stop and spend the night rather than continue driving during inclement weather (Niemcewicz 1965:31).

The bridge at New Brunswick that Isaac Weld, the young Irish gentleman, and Niemcewicz mentioned, was the Albany Street Bridge, a 990-foot wooden span (Johnson 1987:71) that had been opened in 1794 (there is some confusion about the precise year the bridge was completed, but the evidence points to 1794) (Figure 9). Construction of a drawbridge at the foot of Albany Street (also called French Street) had been approved under an act by the General Assembly in 1790. The General Assembly observed that "a Bridge over the said River Raritan would be of public Utility, and greatly contribute to the Ease, Convenience and Safety of all Travelers and others, that may have Occasion to cross the same" (State of New Jersey 1790). This act set forth design specifications for the bridge's construction, mandating that ". . . one Part of it, not less than sixteen Feet, shall hoist or draw for the free Passage of such Vessels with fixed standing Masts, as shall from Time to Time have Occasion to pass up and down the said River Raritan. . . ." In an apparent effort to protect the interests of the bridge proprietors, a provision was included that prohibited the construction of any bridges between the proposed bridge at Albany Street and the bridge at Raritan Landing, and a proposed bridge at the mouth of Lawrence's Brook (State of New Jersey 1790).

In 1791 the General Assembly issued the first of several supplements to the act of 1790. This supplement appointed commissioners for the building of the bridge, and allotted £5,000 from the State to cover construction costs, with any surpluses to be placed in a fund for the future repair of the bridge (State of New Jersey 1791). However, this supplement was repealed in November 1792, when another supplement enacted by the General Assembly placed the right to construct the bridge in the hands of the public, stating, ". . . the Right of building the Bridge over the River Raritan, at the City of New Brunswick, shall forthwith revert to the Petitioners for said Bridge. . ." (State of New Jersey 1792).

The issue of building a bridge at Albany Street was raised at a public meeting held in the barracks in New Brunswick on February 2, 1792. The meeting was ordered by James Schurman, president of the Common Council, for ". . . the purpose of taking under consideration the propriety of raising money by a tax for the purpose of becoming proprietors in the bridge which is to be erected over the Raritan River opposite the French (commonly called Albany) street in this city." Public sentiment ran deep in favor of the proposed bridge (*New Brunswick Sunday Times*, May 25, 1924). The completed structure, contrary to the wishes of the State Assembly, was a wooden covered bridge (A.G. Lichtenstein & Associates, Inc. 1991). The construction of the bridge however, appears to have ultimately been financed with private funds.

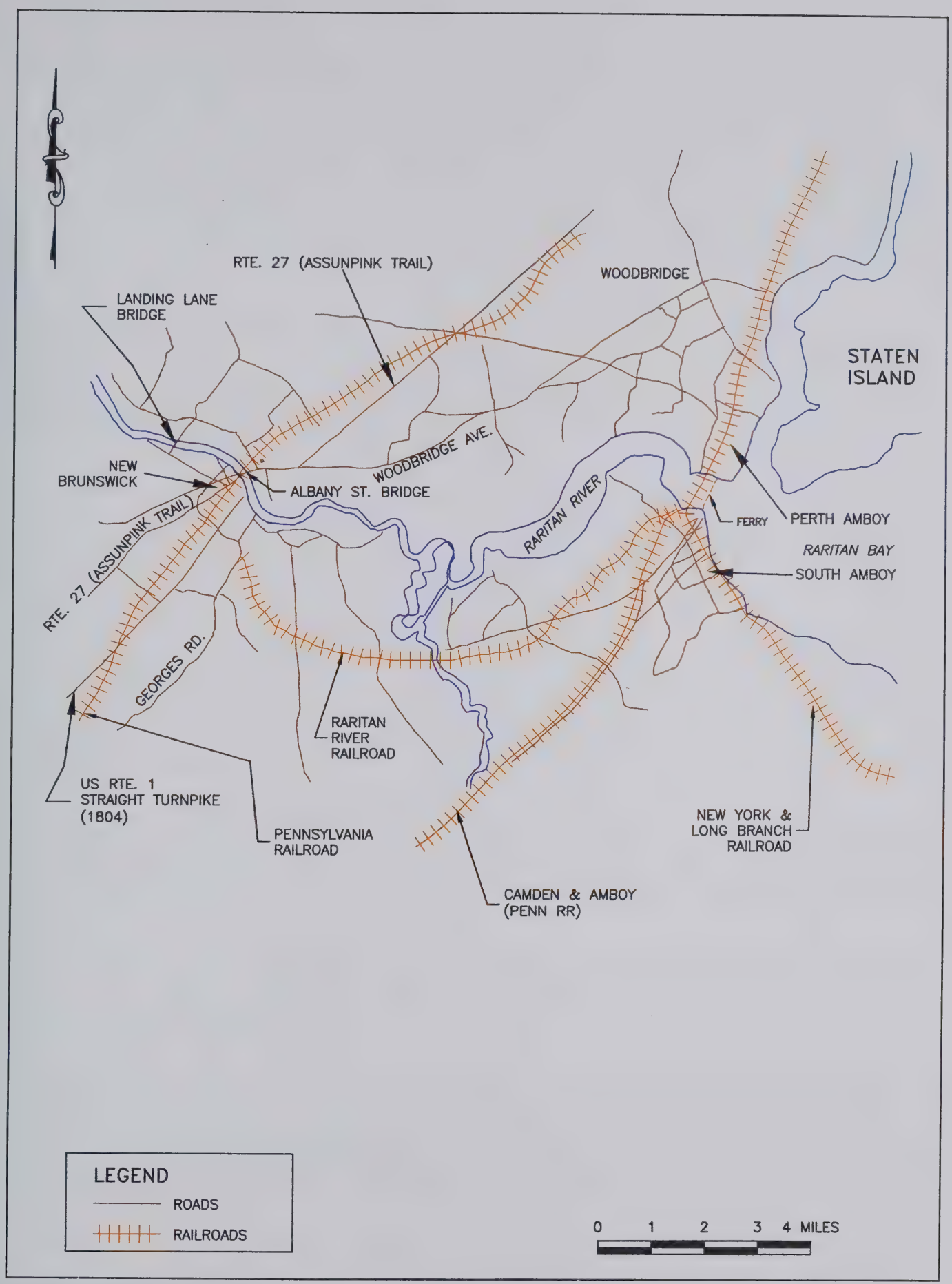


FIGURE 9: Nineteenth-Century Crossings of the Raritan River

Once built, the Albany Street Bridge was operated by the New Brunswick Bridge Company, which charged a toll, a method of financing the structure(s) that continued until 1875 (*New Brunswick Sunday Times*, May 25, 1924). In a 1796 supplement to the act of 1790, the General Assembly answered a petition from the proprietors of the bridge that detailed the excessive construction costs in relation to the original estimates made at the time of the passage of the first act. Consequently, the Assembly approved increased toll rates for all persons, vehicles, and livestock (State of New Jersey 1796). With the new wooden bridge in place, ferry service across the Raritan ceased, and travelers were no longer forced to leave their conveyances to get from one side of the river to the other. The bridge proved to be an immediate success, averaging over $3,600 in toll receipts per year for the first ten years of its existence; this figure jumped to over $5,000 per year between 1806 and 1816 (*New Brunswick Sunday Times*, May 25, 1924).

In 1799 the General Assembly formally incorporated the operators of the Albany Street Bridge under the name "The Proprietors of the New Brunswick Bridge." Principals of the corporation included William Paterson, president; Thomas Marston, John C. Shaw, John Bayard, and Moses Scott, directors; and John Dennis, Jr., treasurer. Under this act, the proprietors' income, outside of that realized from tolls, could not exceed $3,000. This act also guaranteed the proprietors the right to sue for any debt or monies owed the New Brunswick Bridge Company (State of New Jersey 1799).

Julian Ursyn Niemcewicz, after a two-year sojourn in Europe, returned to North America in 1804. In October of that year he took a public carriage, crammed with travelers, from Philadelphia to Trenton. In the years since his first visit in the 1790s, the road between Philadelphia and Frankfort had been paved, probably with small stones or gravel, and the paving was then being extended northward. This route, known as the Frankfort and Bristol Turnpike, was the result of an 1803 Pennsylvania charter, part of the larger charter which created the Lancaster Turnpike Road Company in 1792. The Frankfort and Bristol Turnpike remained the sole route between Trenton and Philadelphia until 1816, when the turnpike between Bordentown and South Amboy was laid out (Lane 1939:149-151). Niemcewicz took a meal in Trenton and stayed overnight at New Brunswick. On another of Niemcewicz's frequent trips along the New York-Philadelphia travel route, he commented on the greed of stagecoach companies. The capacity of the stagecoach was established by statute at six to eight passengers, but often up to twelve passengers were crammed into the stagecoach (Niemcewicz 1965:277, 290).

Overland transportation in Middlesex County and surrounding areas began to improve during the boom in construction of toll roads between 1801 and 1829. One of the most prominent of the toll roads was the Straight Turnpike, the forerunner of present-day U.S. Route 1, which connected New Brunswick and Trenton. The road was laid out in 1804 (Mihalenko 1977:16) and two years later was described in a textbook on rural economy as an exemplary turnpike.

> The turnpike from New Brunswick to Trenton, a line of 25 miles, is nearly the whole length a straight one, so much so, that it cannot be rivalled. The old stage road [Route 27] between the same towns makes 30 miles. The turnpike may be travelled by a horse-man for twelve and a half cents. . . [Johnson 1806:236].

Stagecoaches ran along the Straight Turnpike (U.S. Route 1), bringing additional opportunities for growth to the region, particularly to New Brunswick. The commercial benefits of the turnpike lasted for three decades, but traffic decreased following the construction of the Delaware and Raritan (D&R) Canal in 1834 and the completion of two lines of the Camden & Amboy Railroad, in 1834 (the Main Line between South Amboy and Camden) and 1839 (the Trenton and New Brunswick Branch) (Baer 1981; Mihalenko 1977:16-17).

Raritan Landing, on the other hand, had been essentially bypassed following the American Revolution, although the wooden bridge across the Raritan was maintained to accommodate local traffic. Since its construction in 1773, the bridge was decidedly underutilized, with residents preferring to use the ferry at Inian's crossing and later, the Albany Street Bridge in New Brunswick, which was closer to the main route of travel (*Perth Amboy Evening News* 1940c:21). The bridge at Raritan Landing was initially constructed by two private citizens, John Duykinck and Charles Sudam. However, in response to a petition from residents of Middlesex and Somerset counties, the State Assembly enacted legislation which stated, ". . . the said Sum of One Hundred and Twenty-two Pounds Fourteen Shillings and Three-pence, Money aforesaid shall be paid by the several Town and Precinct Collectors of the Counties of Middlesex and Somerset, according to their respective Quotas, to John Duykinck and Charles Sudam, or either of them, in full of their Accounts of Disbursements for building and completing the aforesaid Bridge over Raritan River at the Landing; any law to the contrary notwithstanding" (Bush 1986:314-315). Although the Raritan Landing bridge was relied upon less than the crossings at New Brunswick, it was still important enough to the local residents to be structurally maintained and kept fully operational. In 1784 a petition was brought before the General Assembly asking the State to assume any expenses incurred in regard to bridge repairs and improvements. The petition also noted that recently, as a result of ". . . the gradual decay of time, aided by the force of vast bodies of ice running in the said river at the breaking up of the last winter, the said bridge become greatly impaired and three of its Pillars were entirely removed . . ."(New Jersey State Archives 1784). The petition also illustrates the importance of New Brunswick to the residents of Middlesex and Somerset counties, calling it the "Principal Market" for their produce (New Jersey State Archives 1784).

The fragility of eighteenth-century bridges is exemplified by the frequent repairs necessary over time. The minutes of the Middlesex Freeholders indicate numerous repair episodes of the Raritan Landing bridge prior to 1830. A receipt dated August 14, 1789, listed £11 paid by the managers of the Landing Bridge to Hendrick Voorhees, for "44 days work as a laborer at the bridge" (Middlesex Freeholders 1789). Other documents that have survived indicate repairs to the bridge during the years 1790, 1797, 1800, 1804, and 1805. A receipt dated November 19, 1797, lists payments of £2 5*s.* for 300 feet of plank, 11*s.* for "carting planks 8 miles," and £1 3*s.* for labor. Repairs to the bridge totaling $414.47, which covered the costs of materials and labor, were recorded between November 1804 and March 1805 (Middlesex Freeholders 1804-1805).

In 1833 the bridge was either substantially rebuilt or replaced. The "turnpike" bridge, as it was called, was built by Hosea Smith of Raritan Landing and was lighted by oil lamps enclosed in wooden boxes. This covered bridge (see Figure 6) remained in service for over 60 years, until it was irreparably damaged by fire on February 18, 1894 (Brydon 1970:42; *Daily Times* 1894a; Wall 1931:32).

The fire began at 1:30 a.m. on a Sunday morning. It was thought at the time that the fire had been caused by an explosion of one of the kerosene lamps which illuminated the bridge or by a lighted match or cigar thrown by a person crossing the span. The fire started at the north end of the structure and burned against a wind that was blowing from the southwest. The wind kept the fire confined to the main structure of the bridge. The A-frame canal bridge, the bridge tender's house, and Conover's Mills, located on the south bank of the river, were spared (*Daily Times* 1894a).

A special meeting of the Board of Chosen Freeholders of Middlesex County was called for the following day to take action on the bridge, which was insured for $15,000. It was anticipated that a greater sum would be required to replace the bridge, as the new structure would have to be made of iron or steel and new piers would have to be built (*Daily Times* 1894a). The bids from one company, The Berlin Iron Bridge Company, encompassed the entire range received, from $6,500 up to $44,000, for bridges of various size and type. This company was initially awarded the contract for a span that was to be 360 feet long, with the capacity to bear

a load of 15 tons. The span was to carry an 18-foot-wide roadway, covered with oak flooring three inches thick, and a 5-foot-wide sidewalk. However, the bidding process and awarding of the contract for the construction of the replacement bridge was mired in controversy that resulted in a lawsuit brought before the New Jersey State Supreme Court. The suit was brought about by the State of New Jersey against the Board of Chosen Freeholders of Middlesex County. Charges of excessive costs and collusion among the bridge companies formed the basis of the lawsuit, which was dropped after the Freeholders agreed to assume the costs and rescind the contract in question (Nielson Papers 1894). The bridge contract was subsequently awarded to the Penn Bridge Company of Beaver Falls, Pennsylvania. In January 1895 a new iron bridge with a plank floor was completed (*Daily Times* 1895) (Plate 1).

The Albany Street Bridge would also undergo reconstruction and complete replacement during the nineteenth century. Although accounts vary, the original Albany Street Bridge, built in 1794, was apparently damaged as a result of flooding and remained unusable for a period of 10 to 15 years, traffic evidently having been rerouted to the railroad bridge to the west. In 1849, the New Jersey legislature approved an act calling for the construction of a new bridge over the Raritan, at the site of the existing span (Otley and Keily 1850) (Figure 10). This act also reaffirmed the rights of the New Brunswick Bridge Company to own and operate the bridge. A new wood truss bridge was completed between 1851 and 1853 and remained in use until 1893 (Plate 2). Tolls were collected until 1875, when the county purchased the structure for $58,000. The 1850s wooden bridge proved inadequate for the increasing traffic at the end of the nineteenth century, so beginning in 1890, the original portion of the existing Albany Street Bridge was erected. The new bridge was built as a 32-foot-wide, seven-span brick arch, with coursed ashlar spandrel walls (Plate 3). The D&R Canal, running along the west bank of the river, was crossed by deck plate girders, one span of which was movable, on masonry columns. At the time of its construction, the 1893 Albany Street Bridge was one of the largest brick arch spans of its day (A.G. Lichtenstein & Associates, Inc. 1991).

2. Canals and Ferries

The inadequacies of the state's roads for transporting large quantities of goods were readily apparent during the early nineteenth century. The roads were crowded and in generally poor condition (although improving) and could not easily support the large numbers of heavy freight wagons necessary for bulk shipment. While seaborne transport was feasible, goods shipped entirely by water between New York and Philadelphia were at the mercy of weather conditions and the dangerous coastline of New Jersey, and a voyage could take as long as two weeks (Cawley and Cawley 1971:211-212). As early as 1676, William Penn initiated a survey of the area to determine the feasibility of constructing an inland navigation route across central New Jersey (Veit 1963:60). In 1804 a company was chartered by the state legislature to create a "slack-water" route from the Raritan River in the vicinity of New Brunswick to tidewater on the Delaware. However, a lack of the requisite stock subscriptions ended the project before it moved beyond the planning stages (Veit 1963:20).

Calls for an inland navigation route to connect the Delaware and Raritan drainages were presented again in 1808 and 1817, but it was not until 1830 that legislation was passed approving its construction. The 93-mile-long D&R Canal opened in 1834 and saved 150 miles in the trip between New York and Philadelphia compared to the shipping routes around Cape May. Anthracite coal was shipped along the Pennsylvania Canal and transferred to the D&R Canal at Lambertville. Barges proceeded down the feeder canal to Trenton and then turned eastward to New Brunswick. Goods shipped through Philadelphia came up the Delaware to the canal's entrance at Bordentown. Once in New Brunswick, the barges transferred to the Raritan River and had easy access to New York (Trenton Printing Company 1939:18).

Construction of canals and railroads through central New Jersey occurred simultaneously and under the same aegis. In 1830, the New Jersey Assembly incorporated the Delaware and Raritan Canal Company following

PLATE 1: Landing Lane Bridge, Constructed in 1894

FIGURE 10: Bridges at New Brunswick, 1850

SOURCE: Otley and Kiley 1850

PLATE 2: Albany Street Bridge, circa 1880

SOURCE: Rutgers Alexander Library, Archives and Special Collections

PLATE 3: Albany Street Bridge, Downstream Elevation, Constructed in 1893, Railings and Fence Added in 1985

two years of intense debate, and ground for the canal was broken later that year (Reilly 1951:4, 248). Successful experiments with locomotives in the mid-1820s had already caught the public eye, but potential competition from railroads was stymied when the Delaware and Raritan Canal Company merged with the Camden & Amboy Railroad Company in 1830. The Camden & Amboy Railroad was completed in 1833, and in the autumn of the same year, water was let into the canal bed between Trenton and Kingston. The canal officially opened in May 1834.

The railroad was initially more profitable than the canal and dominated passenger service and light freight traffic (Veit 1963:61). Bulk goods (coal, iron, lumber, and grain) were moved more efficiently by water, and shipping coal became the largest single source of revenue for the canal, as the anthracite coal from the Pennsylvania fields was sent east. Heavy cargo, particularly coal, associated with the existing interregional trade between New York and Philadelphia, formed the core of shipping along the D&R Canal (Menzies 1976:88; Veit 1963:61). Nevertheless, the volume of freight shipped by rail increased steadily and at a faster rate (Reilly 1951:248-254; Watkins 1891:55).

The transportation of coal and other freight along the canal was a highly specialized endeavor, which necessitated a substantial investment on the part of the canal companies. An inventory of the New Brunswick Street Boat and Canal Company dated April 1, 1839, describes freight and coal barges. This suggests that the physical requirements for coal barges differed significantly from those carrying other forms of freight, further illustrating the importance of coal to the canal economy (Nielson Papers 1839).

The period of greatest prosperity for the canal was from about 1850 to 1875. Its success stimulated growth in Trenton and New Brunswick as well as in the rural environs (Reilly 1951:268). Prosperity also brought improvements to the canal itself. In 1858, all but two of the bridges were widened to enable two barges to pass through at once. Ten years later, steam power was applied to the thirteen locks on the main line, and Locks 7 and 14 were subsequently electrified (Berger 1983:27). At its peak in 1859-1860, the D&R Canal supported over 1,400 barges and handled over two and a half million tons of cargo (Cawley and Cawley 1971:211-212). High levels of traffic continued along the canal during the Civil War years as industries on the lower Raritan River demanded greater and greater amounts of coal to maintain their operations. In 1871 the D&R Canal had come under the lease and control of the Pennsylvania Railroad. The following year, three million tons were carried through the canal, but by 1891 that figure had dropped to one million tons as the railroads cut further and further into the canal's business.

The success of the D&R Canal during its first decades of operation stimulated the rapid industrial growth of New Brunswick and the surrounding area during the 1850s and 1860s. Milling remained important in Middlesex County as the industrial age advanced, but decreased in scale as other economic pursuits were developed, such as the production of rubber goods, shoes, hosiery, carriages, and machinery. The focal point of these industries was New Brunswick, which, as noted earlier, became one of the state's leading manufacturing centers (Bianchi and Rutsch 1979:24). The presence of the canal along this stretch of the Raritan also influenced the design of the road and railway bridges that crossed the river at New Brunswick, since they had to be built to also span the canal and to accommodate barge and canal boat traffic.

Construction of the Albany Street Bridge in 1794 had eliminated the need for ferry service across the Raritan River. However, ferries continued to run between Perth Amboy and South Amboy until at least 1875. For the Perth Amboy-South Amboy ferries, however, unlike the ferry operations between Perth Amboy and Tottenville (Staten Island), little information appears to have survived. The year 1875 saw the construction of the New York & Long Branch swing span across the mouth of Raritan Bay (see below), and with the inauguration of rail passenger service on the New York & Long Branch, the ferry operations apparently ceased.

3. Stagecoach Lines

An integral component of both canals and ferries were the numerous stage lines that represented the overland leg of a journey that was begun on water. New Jersey has the distinction of being the birthplace of the American stagecoach (Johnson 1987:66). Early vehicles, known as "Jersey Wagons," were in use during the 1730s (Fleming 1977:37). These wagons were exceptionally large, requiring teams of four to six horses to pull them. Initially, Jersey Wagons were used solely to transport goods. By 1733 the Jersey Wagon had been modified to transport people (Fleming 1977:37; Johnson 1987:66). These first stagecoaches were designed more for practicality than comfort; there were no springs, and the seats were little more than a plank set crossways with no back. It wasn't until the advent of the Concord stagecoach in the latter half of the eighteenth century, with padded seats and leather-strip suspension, that vehicle comfort improved (Van Hoesen 1976:154-156). Throughout the late seventeenth and eighteenth centuries, stagecoaches traveled over poor roads beset by rutted, rocky surfaces that became muddied and puddled in wet weather, and suffocatingly dusty in dry weather (Johnson 1987:66).

In spite of the uncomfortable, dangerous conditions of early stage travel, it was critical to the development and success of canals and ferries. The emergence of rival stagecoach lines and alternate routes helped speed the journey between New York and Philadelphia, as well as points within New Jersey. By 1738 numerous stages were being run between Trenton and New Brunswick. Another route was established between South Amboy and Bordentown on the Delaware River in 1740. In 1752, Joseph Borden advertised his stage as being capable of making the trip from New York to Philadelphia in thirty to forty hours, a speed which was unheard of at that time (Johnson 1987:66). While roads gradually improved during the eighteenth century, the stage was still inextricably tied to ferries for at least part of any long-distance route. The ferrymen, many of whom owned inns at the ferry landing, were in turn mutually dependent on the stage to provide a captive clientele to patronize the inn's services (Cunningham 1997:133). Advertisements for stagecoach lines often included descriptions of the "comforts of the tavern" and accommodations available (Johnson 1987:66; Van Hoesen 1976:160). In addition, in spite of laws forbidding the practice, ferry schedules were commonly altered to allow passengers time to visit the tavern (Cunningham 1997:133).

Before the introduction of rail service to New Jersey, the combination of stage lines and inns represented a formidable monopoly, interdependent on each other for survival. Prior to 1830, stages had been charging the relatively exorbitant fee of $6 for a one-way trip between Philadelphia and New York. Innkeepers along the route, cognizant that travelers had no other option, also charged high fees while providing minimal service (Menzies 1976:32). Innkeeper Phineas Withington of Kingston could boast of nearly fifty stages and 400 horses at his inn at any one time. The Nassau Hotel in Princeton had as many as fifteen stages headed in each direction, with 100 fresh horses ready to replace wearied ones upon their arrival (Menzies 1976:20).

4. Steamboats

The rise of the steamboat in the East centered around its success along the Hudson River and the surrounding bays (Moss 1966:7). Steamboat activity began in New Jersey in 1786, when inventor Robert Fitch secured a fourteen-year charter from the New Jersey legislature for exclusive rights on the Delaware River (Johnson 1987:75). By 1790 Fitch was making regular trips between Philadelphia and Trenton, with occasional excursions to Wilmington and Chester (Lane 1939:174). Fitch, however, was beaten to the lucrative Hudson River market by Robert Fulton, who surreptitiously acquired information on his plans and drawings and secured a monopoly from the New York legislature in 1808 for steam navigation in the waters of New York State (Johnson 1987:75). For the next sixteen years, Fulton maintained his grip on the New York steamboat trade. Finally, in 1824 a court ruled in favor of Thomas Gibbons of Elizabeth, over Aaron Ogden, successor

to the Fulton monopoly, effectively ending the right of New York to grant exclusive rights to an interstate waterway (Johnson 1987:75-76; Lane 1939:179).

Although Fulton is credited with designing the first truly successful steamboat, Colonel John Stevens of Hoboken certainly played an important role in the evolution and improvement of that design. As early as 1783, Stevens secured a patent for a multitubular steam-engine boiler, which he initially envisioned for use in land railroads (Johnson 1987:75). Stevens's transportation interests, however, went beyond steamboat travel; he was also the owner of the ferry to New York, as well as the president of the Bergen Turnpike Company (Lane 1939:176).

Stevens's position did not go unnoticed by Fulton and his partner, Robert Livingston, who offered Stevens a partnership, perhaps in an attempt to avoid future litigation. Although Stevens declined the offer, which would have allowed him to operate on the Hudson, he took Livingston's suggestion to sail between New Brunswick and New York on weekdays. This advice was not offered out of benevolence, but out of the expectation that Fulton and Livingston could drive Stevens completely out of New York waters when they launched their new boat, the *Raritan*, on the same route with cheaper fares, to compete with Stevens's *Phoenix*. In 1808 Stevens launched the *Phoenix* at the same time that Fulton completed the *Raritan*, and a year later Fulton inaugurated the *Clermont*. Realizing that he wouldn't be able to compete in New York, Stevens turned his attention to the Delaware, which would probably remain outside the future control of the monopolists. In June 1809, Stevens's son, Robert, sailed the *Phoenix* down the coast to the Delaware River, thus becoming the first person to operate a steamboat on the open seas (Johnson 1987:75-76; Lane 1939:178). The following month, the *Phoenix* was making regular trips between Trenton and Philadelphia.

In 1810 Stevens reluctantly entered into an agreement which would provide service between New York and Philadelphia. This involved the *Raritan* sailing between New Brunswick and New York, and the *Phoenix* sailing between Philadelphia and Bordentown, with connecting stage lines servicing three overland routes. These routes were New Brunswick through Princeton and Trenton to Bordentown (fare $4.25), New Brunswick to Elizabethtown Point (fare $3.75), and Bordentown to South Amboy (fare $3.00). Packets were also used to augment the steamboats, making stops at Elizabethtown Point and South Amboy. Competition among stage operators was fierce, with each looking to Stevens and Livingston for an advantage over the others (Lane 1939:179-181).

Although both the steamboat and stage lines were mutually dependent on each other for survival, it was the steamboat line, the Delaware crossing in particular, that was the most profitable. During the thirty-four-week operating season, the *Phoenix* grossed $16,492, which in turn, netted John Stevens a handsome profit. The *Raritan*, which serviced the New Brunswick to New York leg, lost money at first, but eventually ended up making a moderate profit. Moreover, the steamboat operators had the final say in all matters related to the New York to Philadelphia "Steamboat Line." By 1812 competition between stagecoach drivers, particularly along the New Brunswick to Trenton line, had escalated into a bitter dispute, with drivers denigrating the hotels favored by their rivals to attract business to their own line. Finally, Stevens and Livingston brokered a deal with the stage operators whereby the captains of the *Phoenix* and *Raritan* would supply the stage lines with as many passengers as possible. In return, the captains would be paid $0.25 per person, on top of the usual fares of $1.25 for the *Phoenix* and $1.50 for the *Raritan*. The stage drivers in turn, were required to charge $0.25 less, and agree to provide a safe, comfortable journey that would not exceed four hours and fifteen minutes (Lane 1939:181-182).

With the increased construction of turnpikes in the first quarter of the nineteenth century, stage travel improved dramatically. Nevertheless, many still opted for the more pleasurable travel offered by watercraft, thus maintaining the reliance of the stage lines on steamboats for passengers (Lane 1939:194-195). The

monopoly of the water trade, however, was much less certain. In 1813, an attempt by Colonel Aaron Ogden, former governor of New Jersey, to establish a new steamboat line between Elizabethtown Point and New York led to litigation with the Fulton/Livingston interests, who had demanded exorbitant fees for the right to operate in New York. Ogden's political background caused Fulton and Livingston to back down, and they offered him a license for the right to operate a steamboat between New York City and Elizabethtown Point for a fair price.

This agreement, however, did not settle the steamboat monopoly question for long. In 1816, Thomas Gibbons, co-owner of the Elizabethtown Point Ferry property with Aaron Ogden, began to challenge the uneasy alliance of Fulton, Livingston, and Ogden. Having become embroiled in a dispute over ownership of the ferry property with Ogden, the vengeful Gibbons decided to enter the New York steamboat business as a rival to both Ogden and the monopoly. The driven Gibbons purchased the *Stoudinger*, a small steamboat, and enlisted the services of Cornelius Vanderbilt as captain. By 1818 Gibbons was operating the *Stoudinger* and a second boat, the *Bellona*, between New Brunswick and New York City. In 1820 Gibbons initiated the first in a series of court cases aimed at overthrowing the steamboat monopoly. Finally, in 1824, Chief Justice Marshall proclaimed the Fulton/Livingston grant null and void, having determined that commerce, including navigation, was intercourse, thus falling within the purview of Congress to regulate interstate commerce. Henceforth, New York was a free port, a situation which fueled the rapid growth of steamboat navigation between New York and New Jersey (Lane 1939:189-194).

5. Railroads

Noting the deplorable physical conditions of the state's roads and seeing the need for alternative means of transportation, steamboat entrepreneur John Stevens applied to the legislature in 1811 for a charter to enable him to build a railroad across the state. His application was turned down. Subsequently, the War of 1812 and the heavy traffic it generated put unprecedented demands upon the state's roads. After just several years of heavy use, the system was near collapse and the need for faster, more efficient transportation quickly became apparent. In 1815, Stevens reapplied to the legislature and was granted the first railroad charter in the country. He then spent the next decade trying to raise capital from skeptical investors and went so far as to build a 200-foot-diameter demonstration track in Hoboken. On February 4, 1830, the legislature again granted a charter to Stevens and his sons enabling them to construct a railroad along a different route from the one chartered in 1815.

a. The Camden & Amboy Railroad

The new venture of the Stevens family (John and his sons Robert and Edwin), to be called the Camden & Amboy Railroad, was authorized to run between the Delaware River and Raritan Bay. On the same day that the railroad charter was granted, the legislature also granted a charter to the backers of the Delaware and Raritan Canal, to construct a canal in roughly the same corridor. Seeing the potential for vast profits in the transportation of goods, primarily coal, from Pennsylvania to New York harbor, both the railroad and canal supporters had been maneuvering for several years to secure a charter from the state before the other. The legislature had been deadlocked during its 1829 sessions over which charter to grant and ended up granting both only after the principals of each endeavor met, by chance, at a New York City theater, and agreed to a compromise.

The compromise called for each faction to drop their opposition to the other and promise cash payments to the state in return for favorable legislative action. The legislature in turn granted both charters, in the hope that each enterprise would be profitable. (In lieu of taxes, the state would receive tariffs from each company based upon the number of passengers and the amount of freight carried.) It is significant to note that each

charter granted a monopoly to the new corporations. In the railroad's case, the charter stipulated, "That it shall not be lawful, at any time during the said rail road charter, to construct any other rail road or rail roads in this state, without the consent of said companies, which shall be intended or used for the transportation of passengers or merchandise between the cities of New York and Philadelphia, or to compete in business with the rail road authorized by the act to which this supplement is relative."

The railroad proved to be much more popular with the public than the canal. On February 4, 1830, the railroad's stock went on sale and the $1 million offering was fully subscribed within ten minutes. The canal stock, which went on sale the same day, sold only $100,000 in the first several days. By 1831 the first part of the railroad had been completed near Bordentown, but construction on the canal had not yet started. It quickly became clear that the popularity of the railroad, coupled with direct competition in such a narrow corridor, would drive the canal out of business. Canal representatives approached railroad officials to try to avert the canal's fiscal ruin. An agreement was reached whereby the two companies were consolidated into an organization called the "Joint Companies." Each company retained its own organization and officers, but their revenues and expenditures were merged. Their "act of union" was passed by the legislature on February 15, 1831. A subsequent act, proposed by the Joint Companies, enabled the companies to each give 1,000 shares of stock to the state outright in return for a promise from the legislature that no other railroad could compete with the Camden & Amboy between New York and Philadelphia.

This monopoly was threatened briefly in 1834 when the Philadelphia & Trenton Railroad, chartered in 1832 by the state of Pennsylvania, purchased the stock of the Trenton & New Brunswick Straight Turnpike Company and started laying a track between the two cities. The Camden & Amboy responded by purchasing its rival. It secured a charter for the new line on May 15, 1837, and completed the line to Deans Pond, located just south of New Brunswick, in 1838.

b. The New Jersey Rail Road and Transportation Company

On March 7, 1832, the legislature chartered a railroad, to be known as the New Jersey Rail Road and Transportation Company (N.J.R.R.), to run between the Hudson River and New Brunswick. The granting of the charter was done with the implicit approval of the Camden & Amboy, which realized that the new railroad would act as a feeder to its system. Originating in Jersey City and passing through Newark in September 1834, the railroad pushed south through Elizabethtown and Rahway. The corridor the railroad followed between Jersey City and Newark was composed mainly of meadows and swamps. In addition, both the Hackensack and Passaic rivers had to be crossed, providing the N.J.R.R. with valuable bridge-building experience.

The N.J.R.R. reached the north bank of the Raritan River at East New Brunswick (Highland Park) on July 11, 1836. A few days later, a 13-car train pulled by the locomotive *New Brunswick* arrived from Newark. It had made the trip at the then unheard of speed of 15 miles per hour. The passengers detrained and crossed the wooden bridge (the Albany Street Bridge) to New Brunswick via stagecoach. At a ceremony at the New Brunswick Courthouse marking the arrival of the railroad, John Darcy, the president of the N.J.R.R., promised the crowd a railroad bridge over the river and a connection to the Camden & Amboy. Darcy's promise that day was made more out of pragmatism than from good will toward the assembled crowd. The N.J.R.R. was deeply in debt and would be quickly acquired by the Camden & Amboy if it failed.

To build its bridge, the N.J.R.R. first purchased a controlling interest in the New Brunswick Bridge Company, which had a monopoly on bridging the river, for $34,920 ($529,828 in current dollars). Construction of the bridge, which began in August 1836, consisted of placing 17 stone columns in the river and erecting a wooden bridge 1,700 feet in length across them (see Figure 10). The project's engineer was

A.L. Sykes, with Thomas Hazzard serving as architect and builder. The wooden structure, known as the "Railroad Viaduct" cost $57,532 ($872,912 in current dollars) and incorporated two levels into its layout (Figure 11). The upper level carried the railroad, while the lower level, which was covered, carried horses, stagecoaches, and pedestrians. In addition, where the two levels passed over the Delaware and Raritan Canal, the decks were designed to draw up to allow the passage of high-masted barge traffic in the canal below.

Construction of the bridge was finished in November 1837, but it is not clear when the first train crossed the river into New Brunswick. Conflicting accounts report both October 31, 1837, and January 1, 1838, as the date of the initial crossing. Whichever the date, the first train arrived in New Brunswick and stopped at the station on Somerset Street just off George Street. Upon the bridge's completion, negotiations were started with the Camden & Amboy to complete the connection of the two lines. Flexing its muscle, the Camden & Amboy (backed up by the legislature, which it controlled) dictated the N.J.R.R.'s share of the New York to Philadelphia revenue as only one-sixth, in spite of the fact that the N.J.R.R. controlled one-third of the length of the route. The connection was finally made on January 1, 1839, and travelers could make the trip from New York to Philadelphia in five and a half hours.

The new route immediately proved successful. In 1840 travelers between New York and Philadelphia numbered 79,287. By 1860 the figure had increased 288 percent, to 307,884. Local freight was also carried on the route, although it never accounted for a major portion of revenue. In 1840, 5,295 tons were carried, which increased to 115,653 tons (2,084 percent) in 1860. Through freight was carried primarily on the railroad's alternate line to South Amboy, where it was transferred to barges and sloops. The Civil War saw a vast increase in traffic on the line, as thousands of troops, and tons of equipment and supplies, were transported through New Brunswick from points north.

The N.J.R.R.'s bridge served the railroad without major incident until late November 1848, when a runaway locomotive hit the open draw at high speed, destroying it. In 1867 the N.J.R.R., in spite of being the best-planned and best-run railroad in the state, fell victim to a complicated plot engineered by the Camden & Amboy and was acquired by the latter. The new company became known as the United Canal and Railroad Companies of New Jersey, or simply, the United Companies. The United Companies, in turn, leased all their fixed and liquid assets (including 425 miles of track, 128 locomotives, 1,323 cars, the Delaware and Raritan Canal, 33 steamboats, 50 barges and boats, and 77 canal boats) for 999 years to the Pennsylvania Railroad (P.R.R.) on June 31, 1871. The lease became effective at 12:01 a.m., December 1, 1871, and cost the P.R.R. approximately $3,300,000 ($40.9 million in current dollars) annually. From that moment forward, the P.R.R. was a major player in the development of railroads in New Jersey.

The former United Companies right-of-way became the Pennsylvania Railroad's "New York Division," running between Jersey City and its Hudson River ferries and Philadelphia. The bridge over the Raritan became a key link in this route. Major disaster struck the bridge on March 9, 1878, when a fire of unknown origin consumed the entire structure in just 44 minutes. Not everyone thought it was a disaster though, as local boaters and fishermen used the wreckage as a source of free firewood. Four hundred laborers worked around the clock to build a temporary replacement, which was open to railroad traffic just 67 hours later. Shortly thereafter, the railroad's normal schedule was resumed.

The original bridge was replaced by a two-track steel deck truss bridge. The new bridge, which opened on March 14, 1878, was 900 feet in length and had six spans, one of which was a swing span, again to accommodate oversize barge traffic in the canal below (Plates 4 and 5). This bridge figured prominently in a major disaster on February 7, 1885. A northbound oil train had stopped in the middle of the bridge and was struck by another northbound train, igniting a fire that quickly spread to the entire city waterfront. The

FIGURE 11: Lithograph Showing First Railroad Bridge Over the Raritan River at New Brunswick

SOURCE: Rutgers Alexander Library, Archives and Special Collections

PLATE 4: Second Pennsylvania Railroad Bridge, Constructed in 1878

SOURCE: Rutgers Alexander Library, Archives and Special Collections

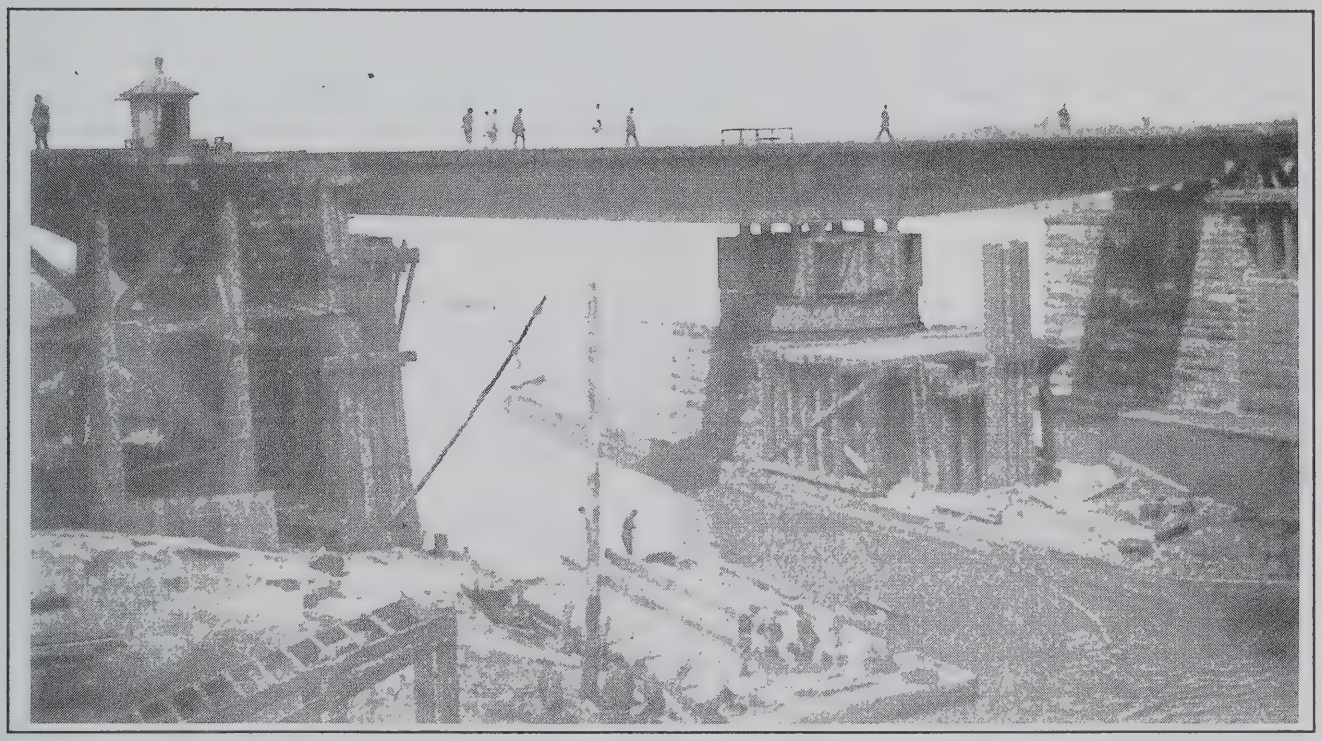


PLATE 5: Swing Span over D&R Canal

SOURCE: Horvath n.d.

fire claimed two lives and resulted in over $1 million (over $17 million in current dollars) in property damage.

c. The New York & Long Branch Railroad

The origins of the New York & Long Branch Railroad (NY&LB) can be traced to the Raritan & Delaware Bay Railroad, which was chartered on March 3, 1854, and ran between Port Monmouth and Camden (via a connection with the Camden & Atlantic Railroad at Winslow Junction). Construction on the line started on May 20, 1856, near Port Monmouth, and the railroad carried its first revenue passengers on January 13, 1860, with service to Red Bank. On June 18, 1860, construction of a branch line from Eatontown to Long Branch was started. Because the Raritan & Delaware Bay line terminated at Port Monmouth, transfer to a steamboat was required for its passengers to complete the trip into New York City.

As it did with just about every railroad in the state, the Camden & Amboy played a major role in the destiny of the Raritan & Delaware Bay Railroad. Because the Raritan & Delaware Bay served Philadelphia (via its connection with the Camden & Atlantic) in defiance of the Camden & Amboy's monopoly of the New York to Philadelphia route, the Camden & Amboy used its "influence" with the legislature to compel the Raritan & Delaware Bay to relinquish to the Camden & Amboy the revenue it earned hauling wartime traffic. This action threw the Raritan & Delaware Bay into bankruptcy. In February 1870, however, it was reorganized as the New Jersey Southern Railroad by several investors, including railroad entrepreneurs Jay Gould and Jim Fisk. The reorganization included the acquisition of a competing railroad, the Long Branch & Sea Shore, which connected Long Branch to Sandy Hook.

The rise of the New Jersey Southern saw a shift in terminal facilities from the former Raritan & Delaware Bay terminal at Port Monmouth to the former Long Branch & Sea Shore terminal on Sandy Hook. This shift made sense to the new railroad because the steamboat trip to New York City from Sandy Hook was shorter than from Port Monmouth. At the same time, however, it angered the citizens of Red Bank and the surrounding area, which was suddenly shifted from the railroad's mainline to a lightly traveled branch line.

Red Bank's anger coalesced and reawakened a long dormant dream of an all rail connection between the shore area and New York City. The impetus for a new railroad was twofold. First, the citizens of Red Bank had grown accustomed to frequent rail service and suddenly found themselves relegated to branch line status. Second, and perhaps more importantly, the steamboat segment of the New Jersey Southern's route was prone to weather-related delays such as ice in winter and the severe coastal storms common to the region. It was thought that an all rail route would be not only faster, but more reliable as well.

On April 8, 1868, the New York & Long Branch Railroad was chartered by the legislature. The charter provided for the construction of a railroad from any point on the Raritan & Delaware Bay Railroad north of Eatontown to South Amboy. The charter also stipulated that the new railroad run through the villages of Red Bank and Matawan. An amendment to the charter gave the railroad the power to continue the line from Red Bank directly to Long Branch, thereby avoiding Eatontown and a more circuitous route. A second amendment, dated March 30, 1869, empowered the railroad to cross the Raritan River by either bridge or ferry.

The New York & Long Branch attempted to interest the Camden & Amboy in sharing the expense of a bridge. The latter declined because they were about to lease all their assets to the Pennsylvania Railroad. The railroad then approached the Central Railroad Company of New Jersey (C.N.J.). The C.N.J. agreed to underwrite, engineer, and construct the NY&LB line in return for a long-term lease. The C.N.J. also constructed a connection for the NY&LB from Perth Amboy to its mainline in Elizabethport (the Perth

Amboy & Elizabethport Railroad). The lease was signed on October 6, 1873, and construction started immediately. Over the next year and a half, the line's final route was fine-tuned and earthwork started. The first section of rail was put down in March 1875 and the line was completed to Long Branch on June 25, 1875. The railroad carried its first revenue passengers on July 7, 1875.

One of the most challenging aspects of the new railroad was the construction of the bridge over the Raritan River. Not only was there a physical challenge in bridging the mouth of the Raritan, but there were also a series of legal challenges. The Pennsylvania Railroad, which had leased the United Companies in 1871, perceived too late that a competitor (the C.N.J., in the form of the NY&LB) was about to tap the potentially lucrative seashore market. As a reaction, it attempted to acquire the new line, but failed. Realizing that the NY&LB would not succeed without a rail crossing over the Raritan, the P.R.R. next tried to block construction of the bridge. The P.R.R. went to court three times, claiming the proposed bridge would impede navigation. Each time the courts upheld the NY&LB. Finally, in early 1873, the P.R.R. gave up and offered the NY&LB $100,000 to widen the bridge's draw opening from 100 feet to 200 feet, which the NY&LB accepted. Construction of the bridge was completed in 1875. The structure, a wooden trestle with a draw span, was 480 feet long (Figure 12; Plate 6).

On June 25, 1875, almost two weeks before the start of regularly scheduled service, the railroad ran a special train for dignitaries from Jersey City to Long Branch. The day's activities included a tour of the new line and a luncheon with Ulysses S. Grant, the president of the United States. The next day, a local newspaper, the *Matawan Journal*, in an article about the events of the day, described the new bridge and its operation:

> Reaching the draw over the Raritan, a delay of some moments was taken for the purpose of allowing the excursionists to get out and witness its working. This grand structure is truly the mammoth triumph in civil engineering. . .the great bridge and the longest draw in the world, opening and closing with its great iron jaws. . . .The Raritan Draw is 472 feet, 32 feet longer than its nearest competitor and weighs about 650 tons. It is supported on the "Pratt Truss Bridge" principal, the trusses measuring forty feet in the center and tapering to thirty feet at the ends. It is twenty feet wide, sufficient for a double track. The cylinder drum upon which the draw revolves is thirty feet in diameter, the cogs running upon a steel cog-wheel track with the center working upon sixteen cone pivots. The engine used for opening hydraulic lifts raises the whole structure between 2 and 3 inches before turning, thus securing an exact fitting of the track at each end when it is swung to position for trains to cross. The total cost of the draw alone, independent of the trestle work connecting over the slope of the river to either shore, was about $125,000 and the six iron spans cost about $10,000 each. . . .Four of the spans are 150 feet each and the other two, 50 feet each. The entire work was furnished by the Keystone Bridge Company, Pittsburgh, Pa.

The Raritan River draw would remain in operation until 1908, when it was replaced by a double-track span (see Chapter IV). The opening of the Raritan River Bridge would spark a new wave of popularity for New Jersey's northern shore resorts. Towns like Long Branch had attracted summer visitors for decades prior to the NY&LB's bridge-building efforts. Long Branch, in fact, had been established as a seaside resort catering to wealthy Philadelphians following the American Revolution. Its popularity soared in the late 1860s and 1870s, when President Grant made the town the nation's unofficial summer capital (Cunningham 1994; Roberts and Youmans 1993). Manasquan, to the south, had been founded in the first decade of the nineteenth century, and by 1834 was attracting visitors for "sea bathing." Sea Girt achieved a degree of popularity after 1852 when Commodore Robert Stockton, of Princeton, built his oceanfront ship-shaped mansion. Point Pleasant was established in 1870, and Belmar and Bradley Beach three years later. What would become the north Jersey shore's most successful resort town, Asbury Park, was founded in 1870, when James A. Bradley (also the founder of Bradley Beach) purchased a stretch of beach just to the north of Ocean Grove, a newly established Methodist camp meeting town. The first hotel was built in 1873, and

FIGURE 12: New York & Long Branch Railroad Bridge Over the Raritan River Between Perth Amboy and South Amboy, 1877

SOURCE: Geological Survey of New Jersey 1877

PLATE 6: New York & Long Branch Railroad Single-Track Raritan Draw-Swing Span. Note the "gauntlet" track, where two tracks merge into a single track. Photo taken prior to 1908.

SOURCE: Wood et al. 1994

by 1878, three years after the opening of the Raritan River drawbridge, eight large hotels and hundreds of smaller boardinghouses had been built in Asbury Park (Cunningham 1994; Roberts and Youmans 1993).

As noted earlier, prior to 1875, vacationers from New York City and northern New Jersey traveled by steamer to Atlantic Highlands, Sandy Hook, or any number of ports along the Navesink and Shrewsbury rivers. From there, a coach or train would take them on to their ultimate destination. The establishment of a string of resort towns along the Atlantic coast attests to the success of this transportation system, which allowed middle-class families, who were acquiring more and more leisure time, to enjoy seaside vacations (Roberts and Youmans 1993; Wood et al. 1985).

However, New Jersey's northern shore resorts, and particularly Asbury Park, would experience unprecedented growth with the establishment of through rail service from northern New Jersey and New York. By 1883 as many as 103 trains were arriving daily at the station shared by Asbury Park and Ocean Grove, bringing in up to 8,000 people in one peak day, and 600,000 people between June and September (Cunningham 1994:222).

IV. THE TWENTIETH CENTURY

IV. THE TWENTIETH CENTURY

A. INTRODUCTION

As America moved into the new century, daily life for many of its citizens had grown immensely complicated, and would become even more so as the twentieth century unfolded. Americans would fight and die in two world wars, and in numerous conflicts both large and small. The country would experience a gut-wrenching depression, and would then become the world's largest industrial and military power. The Victorian fascination with technology and the material world would continue as the American consumer acquired one new invention after another: telephones, radios, Victrolas, automobiles, refrigerators, and on through televisions, compact disks, and personal computers. The country would marvel at the splitting of the atom, and would watch enthralled as a man stepped for the first time on to the moon. On the other hand, Victorian ideals of character, family structure, and social, cultural, and gender relations would be challenged during the first two decades of the twentieth century, sparking a conflict that continues, in one guise or another, today (Coben 1991; Painter 1987).

By the turn of the century, the country had become more urban and suburban; farm families accounted for a smaller and smaller percentage of the population, while producing food for more and more people. Agriculture, long the backbone of the American republic, now had a minor and diminishing place in the economy. Farmers, by the turn of the century, had surrendered their domestic industries and had even stopped processing their own food (Schmidt 1973). Over the ensuing decades, they increasingly specialized and sought new ways to increase efficiency in order to maintain a hold on a market in which so many competed. Farm households had become net consumers, costs of production continued to increase, and profit margins became slimmer and slimmer. The Great Depression of the 1930s would drive thousands of farmers out of business, a trend that would continue through the rest of the century.

In the cities and suburbs, new economic opportunities were opening up, as real incomes increased. By World War I, white-collar managers, sales and servicepeople, technicians, civil servants, and factory supervisors had swelled the ranks of the middle class which, as a group, came to exert increasing control over the nation's political, cultural, and social agendas (Schlereth 1991:xiii). At the same time, a flood of immigrants from central, southern, and eastern Europe, and from Asia, was adding to the population of America's cities, and increasing the numbers of the urban underclasses (Bodnar 1985). Internal migration, particularly during the two world wars as tens of thousands of African-Americans from the south sought work in northern war plants, further increased the population of the country's burgeoning urban areas (Fligstein 1981). In response to the growing cultural heterogeneity of the cities, white upper- and middle-class people accelerated the suburbanization of America that had begun during the nineteenth century (Jackson 1985). The G.I. Bill of Rights, passed following the Second World War, provided the opportunity for millions of veterans to become homeowners, changing forever the landscape of America.

Americans in the twentieth century were moving faster and further than ever. At the turn of the twentieth century, railroads were the catalyst for the creation of suburbs (Cunningham 1966:240). At that time the railroads dominated the transportation industry, particularly over long distances, while trolley and interurban streetcar lines whisked passengers from place to place in the cities and suburbs. These lines connected the larger cities, as well as providing service to ferry ports on the Hudson and Delaware (Bebout and Grele 1964:43). Such modern transport, coupled with the possession of more leisure time and discretionary income, meant that the annual vacation became a middle-class ideal (Bledstein 1976:64). Workers, who were often unable to take off for extended periods of time, commonly made one-day excursions to the seashore and amusement resorts, like Coney Island, Palisades Park, and Atlantic City (Schlereth 1991:19).

Invented at about the same time as the electric trolley, the automobile took rather longer to gain widespread acceptance. Before the turn of the century, the automobile had been a plaything for the wealthy, but the mass-production techniques pioneered by Henry Ford would soon make the "horseless carriage" affordable to most American consumers. By 1916, Ford's Model T sold for $360; in that same year, U.S. automobile manufacturers produced 1.7 million motor cars and over 180,000 commercial vehicles. From a novelty (which often served mainly to frighten horses), the automobile would become an American obsession. Regarding the impact of the automobile on life in the United States, Thomas J. Schlereth observes that

> the self-propelled vehicle altered commuting and communicating routines. It created a new built environment of auto showrooms, gasoline stations, motels, fast-food franchises, and surface highways. It fostered driving schools (YMCAs offered such instruction by 1904), and necessitated personal liability insurance (over twenty-five thousand drivers in New York City had such coverage by 1916), and stimulated a new era in American cartography (thousands of road maps were distributed by oil companies by the 1920s). It gave new meaning to the American fascination with being on the move. With the massive highway system it ultimately created, it eventually transformed the American house (with its built-in garage), as well as the urban and rural landscape [Schlereth 1991:26].

Only the development of the passenger jet plane would have a comparable effect on the travel habits of the American public.

No other facet of American transportation had such a profound effect on urban development and the rise of suburbs as the automobile. Early in the twentieth century, the automobile facilitated access to railroad and trolley stations. After World War II, the expansion of road systems allowed travel to areas not confined to the limits of existing rail lines (Bebout and Grele 1964:52). Automobile ownership in New Jersey increased exponentially from the early twentieth century. In 1907 there were 17,619 automobiles registered in New Jersey. By 1929 that figure climbed to more than 800,000 (Bebout and Grele 1964:54). In response to the rapid growth of automobile ownership, the Port of New York Authority was created in 1921 to oversee the construction of road links between New York and New Jersey (Bebout and Grele 1964:57). The period after World War II also saw the automobile erode commuter traffic away from railroads, as large-scale industries relocated to the suburbs to take advantage of low taxes, moderate overhead, and new roads (Bebout and Grele 1964:71).

B. POPULATION

The population growth trends in Middlesex County abruptly changed following the turn of the century (Figure 13; Table 6). Between 1900 and 1910, the population growth rate in Middlesex County exceeded the statewide growth rate for the first time since 1800. With the exception of the 1930s, this trend continued up through 1970. In addition to this higher growth rate, with each successive census Middlesex County represented a larger proportion of the state's population, increasing from 4.2 percent of the state's population in 1900 to 8.7 percent in 1990. By 1920, the population of Middlesex County exceeded the population of each of the surrounding counties with the exception of Union County; it wasn't until 1970 that Middlesex County became the most populous county in central New Jersey. The most significant population increase in Middlesex County occurred during the 1950s, when 168,984 residents were added, an increase of approximately 63.8 percent for the decade. The dramatic growth of Middlesex County during the 1950s coincides with the opening of two major highways, the New Jersey Turnpike and the Garden State Parkway.

During the first two decades of the twentieth century, population growth continued to be concentrated in the urban areas, with Elizabeth, Perth Amboy, and Newark exceeding the growth rate for New Jersey. During these years, a large portion of the population growth in Middlesex County occurred in New Brunswick and

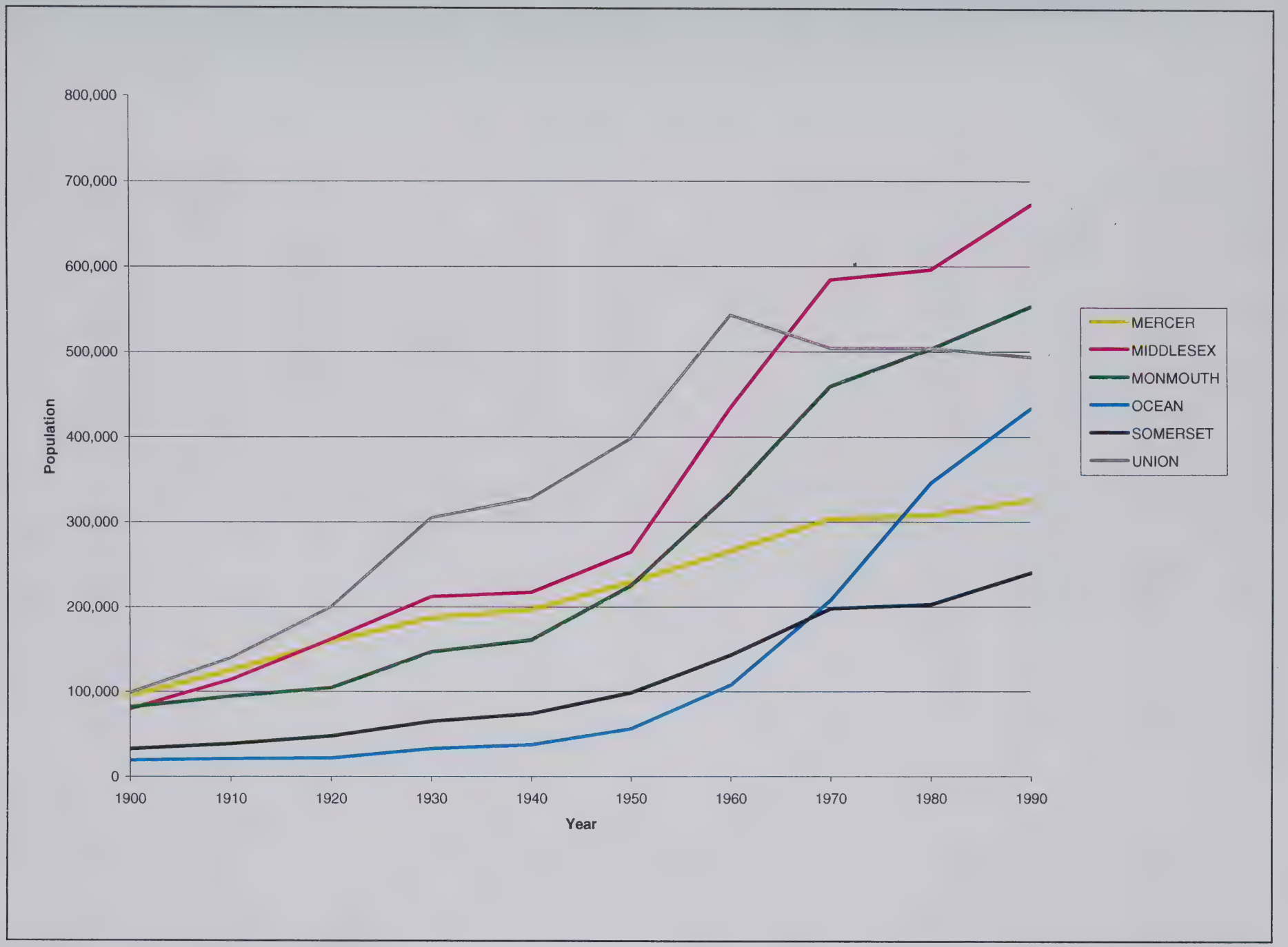


FIGURE 13: County Population, 1900-1990

SOURCE: U.S. Bureau of the Census

Table 6: Population in New Jersey and Selected Counties
1900-1990

	New Jersey		Middlesex County			Monmouth County			Mercer County		
Year	Population	% Growth	Population	% Growth	% of State	Population	% Growth	% of State	Population	% Growth	% of State
1900	1,883,669		79,762		4.2%	82,057		4.4%	95,365		5.1%
1910	2,537,167	34.7%	114,426	43.5%	4.5%	94,734	15.4%	3.7%	125,657	31.8%	5.0%
1920	3,155,900	24.4%	162,334	41.9%	5.1%	104,925	10.8%	3.3%	159,881	27.2%	5.1%
1930	4,041,334	28.1%	212,208	30.7%	5.3%	147,209	40.3%	3.6%	187,143	17.1%	4.6%
1940	4,160,165	2.9%	217,077	2.3%	5.2%	161,238	9.5%	3.9%	197,318	5.4%	4.7%
1950	4,835,329	16.2%	264,872	22.0%	5.5%	225,327	39.7%	4.7%	229,781	16.5%	4.8%
1960	6,066,782	25.5%	433,856	63.8%	7.2%	334,401	48.4%	5.5%	266,392	15.9%	4.4%
1970	7,168,143	18.2%	583,813	34.6%	8.1%	459,379	37.4%	6.4%	303,968	14.1%	4.2%
1980	7,364,823	2.7%	595,893	2.1%	8.1%	503,173	9.5%	6.8%	307,863	1.3%	4.2%
1990	7,730,188	5.0%	671,780	12.7%	8.7%	553,124	9.9%	7.2%	325,824	5.8%	4.2%

	Ocean County			Somerset County			Union County		
Year	Population	% Growth	% of State	Population	% Growth	% of State	Population	% Growth	% of State
1900	19,747		1.0%	32,948		1.7%	99,353		5.3%
1910	21,318	8.0%	0.8%	38,820	17.8%	1.5%	140,197	41.1%	5.5%
1920	22,155	3.9%	0.7%	47,991	23.6%	1.5%	200,157	42.8%	6.3%
1930	33,069	49.3%	0.8%	65,132	35.7%	1.6%	305,209	52.5%	7.6%
1940	37,706	14.0%	0.9%	74,390	14.2%	1.8%	328,344	7.6%	7.9%
1950	56,622	50.2%	1.2%	99,052	33.2%	2.0%	398,138	21.3%	8.2%
1960	108,241	91.2%	1.8%	143,913	45.3%	2.4%	543,116	36.4%	9.0%
1970	208,470	92.6%	2.9%	198,372	37.8%	2.8%	504,255	-7.2%	7.0%
1980	346,038	66.0%	4.7%	203,129	2.4%	2.8%	504,094	-0.0%	6.8%
1990	433,203	25.2%	5.6%	240,279	18.3%	3.1%	493,819	-2.0%	6.4%

Source: U.S. Census

Perth Amboy. However, beginning in the 1930s, the urban areas of New Jersey showed marginal growth at best, and in most cases showed a loss of population with each successive census. After the initial gains of the early 1900s, New Brunswick and Perth Amboy reflected the trends of the other urban areas, gaining little or losing population while the rural and suburban areas of Middlesex County became developed.

The growing popularity of the automobile and the rapidly expanding network of roads and highways facilitated population growth in New Jersey, particularly in suburban and rural regions throughout the state. Bergen County suburbs grew by 154,000 between the years 1920 and 1930. During the same period, Essex County grew by 181,000 inhabitants, of which only a relatively small number (28,000) were in the urban area of Newark. Also during this period, Passaic County and Union counties experienced population increases of 48 and 22 percent respectively, while the counties of Hudson and Cumberland each grew by 15 percent (Bebout and Grele 1964:61). A 1958 New Jersey Highway Authority study of the Garden State Parkway reported that population along the parkway corridor grew at a faster rate than other areas in New Jersey, suggesting that increased road and highway access has a direct impact on population growth (Cranmer 1964:67).

C. ECONOMIC ACTIVITY

The growth of the City of New Brunswick during the last quarter of the nineteenth century and the first two decades of the twentieth century had profound effects upon the surrounding region; industry expanded into areas within a mile of the central core of the city, and new suburban developments grew up in the surrounding area. Beginning in the 1930s, however, most of Middlesex County's older industries (like brick making) went into decline. Although many of the plants maintained production through the Second World War, they were unable to compete after hostilities ceased, and many moved out of the area altogether. New Brunswick's function as a port also declined as rail transport became the prime mover of goods. The generally poor condition of the river channel upstream from Sayreville also contributed to the problem, as modern ships found it increasingly difficult to make the trip upriver. The final symbolic act in New Brunswick's demise as a port came with the construction of the New Jersey Turnpike bridge over the Raritan River in 1951, a structure with such low clearance that only the smallest of commercial vessels could pass upriver. Over the last 30 years, however, the economic decline of the 1930s and early 1940s has been gradually reversed as the county has made the transition from heavy industry to light industry and research (Berger 1991b:13). A number of new light industries have moved into municipalities such as Edison and East Brunswick Township, within easy reach of the major regional highway routes (e.g., New Jersey Turnpike, Garden State Parkway, U.S. Route 1, and N.J. Route 18).

Like heavy manufacturing, farming and the exploitation of the river's natural resources in the lower Raritan Valley have also decreased markedly during the twentieth century. Prior to the 1940s, most bayshore residents had made their living by farming, fishing, or shell fishing. The burgeoning population and industrialization along the Raritan River, Hudson River, and Arthur Kill polluted the bay with sewage and industrial wastes. The number of fish entering the bay declined, probably the result of heavy fishing on the continental shelf off the East Coast (MacKenzie 1992:236-238).

In 1925, Raritan Bay's oyster industry was finally finished by pollution. Oysters were supplanted by food fish in the bay's economy. Another important fish, bunkers, were processed for their oil, and their scrap was used as fertilizer (MacKenzie 1992:55-57). However, fishermen in Perth Amboy had relied upon oysters for generations, and the closure of the beds brought an economic decline which was exacerbated by the Great Depression soon after. Pollution closed the bay to clamming beginning in 1942 (MacKenzie 1992:216).

Traditionally, farmers within 10 miles of the bay shore shipped most of their produce, including apples, asparagus, carrots, corn, lettuce, melons, potatoes, strawberries, squash, and tomatoes, to market in Manhattan, via passenger-freight ferries from Perth Amboy and other ports on the bay shore (MacKenzie 1992:112). As in the rest of New Jersey during the twentieth century, farming had become less and less viable economically, although many farms had survived until mid-century. In 1950, 33 percent of Middlesex County land was in farms. Twenty-three percent of the farms were poultry, 16 percent were planted in field crops, and 38 percent were flower farms, part-time farms, or residential farms. By 1960, however, industry (primarily light industry) had become the primary component of the economic base of Middlesex County. That year, the majority of workers in the county were machine operators, and there were over 30,000 people in that profession. Farming ranked seventh and last, with less than 2,500 people in the county engaged in that occupation (Brush 1956:86-87; Middlesex County Council 1964:1-2).

Perth Amboy, like New Brunswick, would enter the twentieth century on the upswing, and would experience a rapid decline during the Great Depression. The terra cotta industry, for example, all but disappeared with the change of architectural style and changes in building technology (League of Women Voters 1961:5-6). However, an upsurge during and after World War II helped Perth Amboy retain much of its industrial base into the 1960s. The shift from coal to oil after the war, while diminishing Perth Amboy's importance as a rail terminal, helped attract a number of new industries. As coal shipments dwindled, Perth Amboy's harbor facilities attracted oil refining businesses. By 1960, 103 industrial firms were active in Perth Amboy (League of Women Voters 1961:6). Within two decades, however, the economic picture had changed. Rising labor costs, government regulation, and the loss of tax incentives forced much of the heavy industry to leave Perth Amboy. The development of major highways and the construction of shopping malls has contributed to the decline of Perth Amboy's downtown area (Seguine-LeVine 1996).

The construction of new highways sparked a new, and continuing, wave of development south of the Raritan. Service industries, restaurants, motels, and drive-in theaters sprang up along roadways like U.S. Route 1, U.S. Route 9, and N.J. Route 35, or along connecting roads that intersected the New Jersey Turnpike and Garden State Parkway. New housing subdivisions were built, particularly after World War II, as people moved further and further from crowded urban areas, choosing to commute longer and longer distances to work. Southern New Jersey, especially the Lakewood area, saw the construction of numerous retirement communities that were accessible to major north-south and east-west roadways. Commercial and residential infilling continues, with the construction of shopping malls and condominium and townhouse developments.

D. IMPROVEMENT OF THE RARITAN AND RIVER NAVIGATION

A commission was formed in the 1920s to investigate the potential for developing the area between New Brunswick and the Amboys into the so-called "Port Raritan District." This proposed district also included the area bordering the South River, Raritan Bay, Arthur Kill, and Woodbridge Creek. The commission reported in rather turgid prose that "the potentiality of this arterial stream in transportation properly and scientifically taken advantage of makes it an invulnerable fortress of economic strength in relation to the position it holds within the limits of the greater and expanding District of the Port of New York" (Staniford 1925:9). The 1920s saw many industries seeking sites for relocation, and the commission, made up of community leaders from Perth Amboy, New Brunswick, South Amboy, South River, Woodbridge Township, Sayreville Township, and Raritan Township (now Edison Township), saw the marsh and meadow flanking the Raritan River and South River as ideal for sites for hundreds of industrial plants, and the upland as just waiting for housing developments (Staniford 1925:9-10).

During World War I it became clear that the United States did not have the facilities necessary to handle commercial shipping (in times of emergency). The federal government spent considerable sums of money

after the war trying to rehabilitate the nation's waterways, but railroads, fearing competition, lowered their rates to prevent the use of water transportation (Staniford 1925:10).

The 1925 survey found that there was enough movement of goods in and through the Port Raritan District to justify the development of the district (Staniford 1925:12). The commission contended that water transportation was the lowest in cost and that little had been done to build up and maintain the waterways in augmenting regional transportation needs. The commission attributed the ever-growing disuse of the Delaware and Raritan Canal to its absorption by competing railroads (Staniford 1925:13), and contended that even in its unimproved state in 1925, the Raritan River carried enough tonnage to justify its improvement (Staniford 1925:13).

The commission recommended that a channel depth of 15 feet at mean low water and a width of 200 feet from Keasby to the Washington Canal, a distance of 4.7 miles, and a channel depth of 10 feet at mean low water and a width of 150 feet to the entrance of the Delaware and Raritan Canal at New Brunswick, a distance of 5.3 miles, be maintained. Also to be maintained was a south channel between Crab Island and Kearney's Dock, 10 feet deep at mean low water and 150 feet wide, a distance of 2.97 miles. A 15-foot-deep channel 200 feet wide had been made to the Washington Canal, a distance of 6.7 miles from the mouth; a 10-foot-deep channel 200 feet wide to about Whitehead's Dock, a distance of 1.3 miles; and a channel 10 feet deep and 100 feet wide to the lock at New Brunswick. In 1925 the South Channel had been dredged to a depth of 10 feet and a width of 150 feet for a distance of three miles, reaching to within a mile of its upper end. A 15-foot depth had been maintained up to the Washington Canal, a 10-foot depth up to Martin's Dock, and a lesser depth up to the canal lock. In 1925 the South Channel was maintained at a depth of between 7 and 8 feet below low water to Crossman's Dock, and at a depth of only about 3.5 feet to the upper end of the channel. The channel needed to be widened from Whitehead's Dock to the canal lock, a distance of about four miles, from 100 to 150 feet in width, while the upper 1,300 feet of the South Channel needed to be dredged (Staniford 1925:23).

The commission felt that attention should be focused on the main channel given that use of the South Channel had been very limited. They felt it was absolutely essential that the 15-foot depth should be extended past the Washington Canal all the way to the head of navigation at the New Brunswick canal lock, contrary to the provisions of the River and Harbor Act of 1919 (see below). The 15-foot depth was far more important that the 150-foot width, and it was recommended that the additional costs of dredging be offset by reducing the width to 100 feet (Staniford 1925:24). In addition, the commission recommended that new channels be cut to eliminate sharp bends in the river, beginning near Crab Island and ending near Martin's Dock (Staniford 1925:24).

The commission also surveyed industries located along the Raritan and determined that 339,500 tons of material moved into the Port Raritan District, of which 200,000 tons, or 59 percent, was moved by water. At the same time, 383,500 tons moved out of the district, of which 328,500, or 86 percent, was transported by water (Staniford 1925:28). In 1924 the Department of Commerce ranked Perth Amboy as the eighteenth busiest port in the United States. One million eight hundred thousand tons of material were handled through the port, much of it in the form of raw materials such as crude oil, crude asphalt, and copper (Staniford 1925:29).

The commission recommended that the best means of moving goods through New Brunswick was by a coordinated river and motorized transportation system. A motorized express service was already in place between New Brunswick and New York by 1925. The commission contended that a door-to-door shipment of goods by rail between New Brunswick and New York would take five to seven days; a shipment to or

from New England would take five to ten days, but the coordinated water and truck service would take 24 hours (Staniford 1925:36-37).

During World War I the federal government had taken over a large area on the north side of the Raritan River between Keasby and the Nixon plant for the production and storage of explosives (Staniford 1925:41). The commission felt that as the military need for the Raritan Arsenal subsided in the wake of World War I, the government should dispose of the property, which was ready-made for development as a marine terminal and industrial site. If retained by the federal government, the Raritan Arsenal would inhibit development in its vicinity (Staniford 1925:41).

The existing navigation channel in the Raritan River was authorized by the River and Harbor Act of 1919 and subsequently modified by Acts of July 3, 1930, August 26, 1937, October 17, 1940, and October 23, 1962. These Acts provided for

> A main channel, 25 feet deep and 300 feet wide, from the turn in New York and New Jersey Channels, near Great Beds Light to the Raritan Center (Raritan Arsenal) Wharf; thence 15 feet deep and 200 feet wide, to the Washington Canal; thence 10 feet deep in soft material and 11 feet deep in rock and generally 100 feet wide, with widening at bends, to the Delaware and Raritan Canal entrance at New Brunswick; about 13.8 miles [U.S. Army Corps of Engineers 1978].

Waterborne-commerce data compiled by the U.S. Army Corps of Engineers since 1890 provide an indication of the type and quantity of goods and materials shipped via the Raritan River. As shown in Figure 14, annual shipments on the Raritan River totaled less than 2 million tons between 1890 and 1934. Total shipments rose dramatically in 1935, led in part by an increase in coal shipments, presumably to fuel the several electric generating stations located on the Raritan River. Total shipments fluctuated greatly during the 1940s, with a peak in 1942 of more than 8 million tons, reflecting the wartime activity at the Raritan Arsenal. Shipments on the Raritan River reached an all-time peak in 1968 with total shipments of approximately 11 million tons, composed primarily of coal, residual fuel oil, and waste material shipped via the Raritan for disposal at sea. Since that peak year, commerce on the Raritan River has declined to approximately 2 million tons annually, composed primarily of petroleum products and sand and gravel. The decline reflects the closing or reduced activity of major industrial operations along the Raritan River waterfront, including NL Industries, National Fire Proofing Company, National Carborundum, and the Raritan Arsenal.

Figure 15 illustrates the annual shipments of three selected commodities between 1915 and 1995: coal; sand, gravel and crushed stone; and petroleum products, including gasoline, kerosene, residual fuel oil, and distillate fuel oil. The coal shipments are associated with the consumption of coal at area electric generating stations operated by Public Service Electric and Gas and Jersey Central Power & Light rather than the export of coal. The shipment of petroleum products is associated primarily with the Hess Oil Terminal, located between the Edison and Victory bridges.

E. THE RISE OF AUTOMOBILE OWNERSHIP AND HIGHWAY CONSTRUCTION

During the second half of the nineteenth century the regional road system had suffered due to the primacy of the railroads in moving freight and people. Long-distance travel by road was often a last resort on thoroughfares that were considered some of the worst in the industrialized world. In the 1880s, the growing popularity of the bicycle would provide the first impetus for change in this deplorable situation. By 1890, the bicycle craze had become an economic, political, and social force in the United States. In that year alone, over one million bicycles had been produced, but outside of America's cities bad roads made bicycling a laborious, even dangerous pastime. In response to this problem, bicycle groups, led by the League of American Wheelmen, and manufacturers like Colonel Albert Pope, launched the Good Roads Movement.

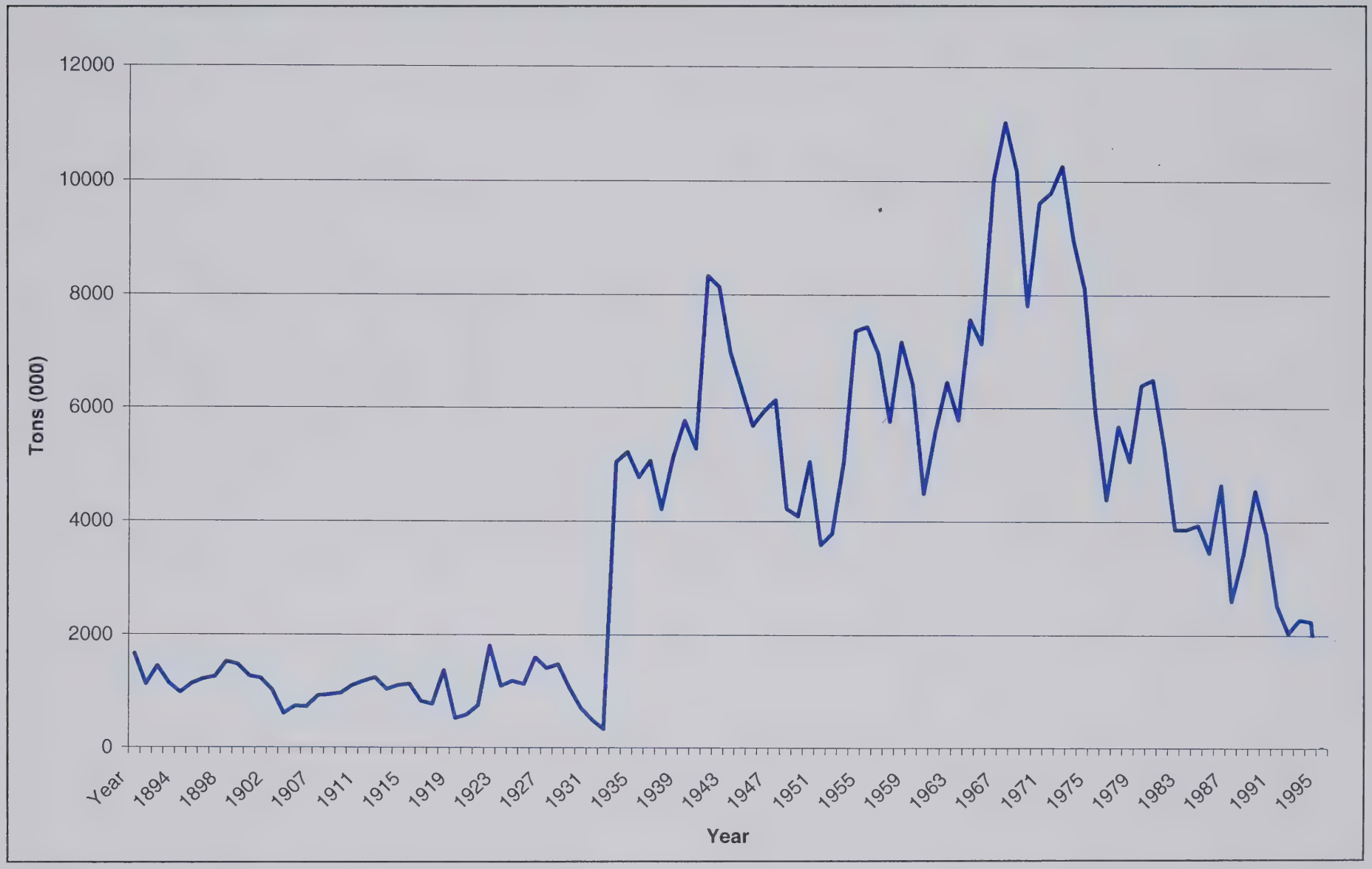


FIGURE 14: Total Shipments on the Raritan River, 1890-1996

SOURCE: U.S. Army Corps of Engineers

FIGURE 15: Selected Commodity Shipments on the Raritan River, 1910-1995

SOURCE: U.S. Army Corp of Engineers

Working at the federal, state, and local level, these groups and individuals attempted to secure road improvement legislation. Failing in their attempt to interest farmers and their state and national organizations, the Good Roads Movement would be dominated by bicycle interests until the late 1890s.

In 1893, the Office of Road Inquiry (ORI), predecessor to the Federal Highway Administration, was created, with a staff of two, to examine the issue of public roads. General Stone, a Civil War hero and a civil engineer, was chosen to be special agent and engineer for road inquiry. Under his guidance, the ORI instituted the object lesson road program and cooperated with the Post Office Department in its experiments with Rural Free Delivery. Rural Free Delivery convinced the country's farmers of the value of good roads and brought them into the Good Roads Movement.

Over the next decade the ORI, renamed the Office of Public Road Inquiries (OPRI), expanded its promotional and technical activities and cooperated with railroad companies and good roads promotional groups, and in 1904 began an inventory of all rural roads in the United States. In 1905, the agency was renamed the Office of Public Roads (OPR). By 1914, the explosion in automobile travel—a result of the greater availability of the car to the average family—had increased pressure on the federal government to provide funds for road building outside federal lands, pressure that would eventually lead to passage of the Federal Aid Road Act of 1916 (Seely 1987).

In 1901, New York was the first state to require registration of all motor vehicles. New Jersey followed with perennial registration in 1903 and annual registration in 1906. By 1915 all states had a motor vehicle registration law, but it was not until 1921 that annual registration was required by all states. In addition to providing regulatory control over the number of motor vehicles, states soon found that registration taxes and license fees served as a major source of revenue for highway construction and maintenance. Until 1929, this source provided the major share of revenue derived from highway users (USDOT 1997).

Automobile ownership trends, as illustrated by motor vehicle registration statistics, reflect three major periods marked by increased industrialization during the first half of the twentieth century: economic depression, World War II, and, finally, post-war prosperity (Tables 7 and 8). Between 1915 and 1930, the number of automobiles registered in New Jersey increased nearly tenfold, reflecting a period of rapid population growth and economic expansion, particularly in the New York metropolitan region. This period followed the creation of the New Jersey State Highway Commission in 1909 and legislation in 1912 that directed the establishment of a comprehensive scheme of roads to be known as the State Highway System. That year also marked the formation of the Lincoln Highway Association, an organization founded to promote the development of a transcontinental highway from New York to San Francisco; the Lincoln Highway was eventually routed through New Brunswick, crossing the Raritan River at the existing Albany Street Bridge. In 1916, Congress appropriated $75 million for highway improvement and, in doing so, established the Federal Aid System as the framework for the country's highway system. The act gave the individual states ownership of the highways and the power to construct, maintain, and regulate. It also initiated a funding formula, based upon population, area, and mileage, that allocated federal highway funds to each state. Further state legislation in 1917 created the New Jersey Highway Department and designated 15 routes as comprising the State Highway System, including Route No. 1 from Elizabeth to Trenton by way of New Brunswick and Route No. 4 from Rahway to Absecon (near Atlantic City) by way of Perth Amboy. However, significant progress in the development and improvement of highways in New Jersey was delayed by the onset of World War I.

Following World War I, attention returned to the need for improved highways, and in 1921 Congress passed the Federal Highway Act, which incorporated some 200,000 miles of roads into a federal system of numbered highways. In 1927, the New Jersey Highway Department submitted a plan for a comprehensive

Table 7: Motor Vehicle Registrations
1900-1995

	U.S.		New Jersey	
Year	**Number**	**% Growth**	**Number**	**% Growth**
1900	8,000		300	
1905	77,400	867.5%	3,570	1090.0%
1910	458,377	492.2%	16,160	352.7%
1915	2,332,426	408.8%	72,448	348.3%
1920	8,131,522	248.6%	177,337	144.8%
1925	17,481,001	115.0%	469,156	164.6%
1930	23,034,753	31.8%	718,025	53.0%
1935	22,567,827	-2.0%	762,425	6.2%
1940	27,465,826	21.7%	949,612	24.6%
1945	25,796,985	-6.1%	869,809	-8.4%
1950	40,339,077	56.4%	1,352,681	55.5%
1955	52,144,739	29.3%	1,807,071	33.6%
1960	61,671,390	18.3%	2,123,014	17.5%
1965	75,257,588	22.0%	2,654,571	25.0%
1970	89,243,557	18.6%	3,216,691	21.2%
1975	106,705,934	19.6%	3,735,985	16.1%
1980	121,600,843	14.0%	4,256,753	13.9%
1985	127,885,193	5.2%	4,402,075	3.4%
1990	133,700,496	4.5%	4,553,239	3.4%
1995	128,386,775	-4.0%	4,433,631	-2.6%

Source: U.S. Department of Transportation, Highway Statistics Summary to 1995.

Table 8: Annual Motor Vehicle Registration for Selected Counties 1925-1947

Year	Bergen	Essex	Hudson	Middlesex	Passaic	Union	Total	% Growth
1925	34,618	114,398	63,605		46,590	39,825	264,418	
1926	56,409	127,681	73,172		46,101	44,939	291,893	
1927	64,824	141,270	73,761		49,975	50,570	315,576	
1928	71,012	153,737	80,316		55,307	57,035	346,395	
1929	82,262	168,848	85,999		59,006	63,863	377,716	42.85%
1930	86,454	173,835	88,074		59,183	66,369	387,461	
1931	90,756	176,535	90,137		61,541	68,837	397,050	
1932	92,228	174,260	88,295		61,010	71,623	395,188	
1933	83,475	175,141	88,834		57,409	66,183	387,567	
1934	95,201	176,701	90,384		60,527	71,355	398,967	2.97%
1935	98,404	181,898	95,340		61,654	72,946	411,838	
1936	104,124	194,504	102,691		65,621	78,961	441,777	
1937	109,778	204,570	110,310		69,538	84,660	469,078	
1938	114,069	209,592	113,643		71,193	87,564	481,992	
1939	116,344	208,164	114,615		73,419	89,128	485,326	17.84%
1940	123,690	217,427	120,387		78,696	94,822	511,332	
1941	132,857	231,245	127,004		85,639	102,979	546,867	
1942	128,671	216,255	115,341		79,405	99,147	510,148	
1943	107,262	198,814	103,207		73,508	93,272	468,801	
1944	105,494	190,833	97,730		74,400	91,594	454,557	-11.10%
1945	111,477	200,268	99,324		77,792	95,066	472,450	
1946	123,770	217,212	106,392		84,895	105,229	513,728	
1947	134,937	239,816	120,276		94,186	116,028	570,306	20.71%

NO DATA AVAILABLE

Source: Report on Estimated Traffic and Revenues of the Proposed New Jersey Turnpike, September 1949.

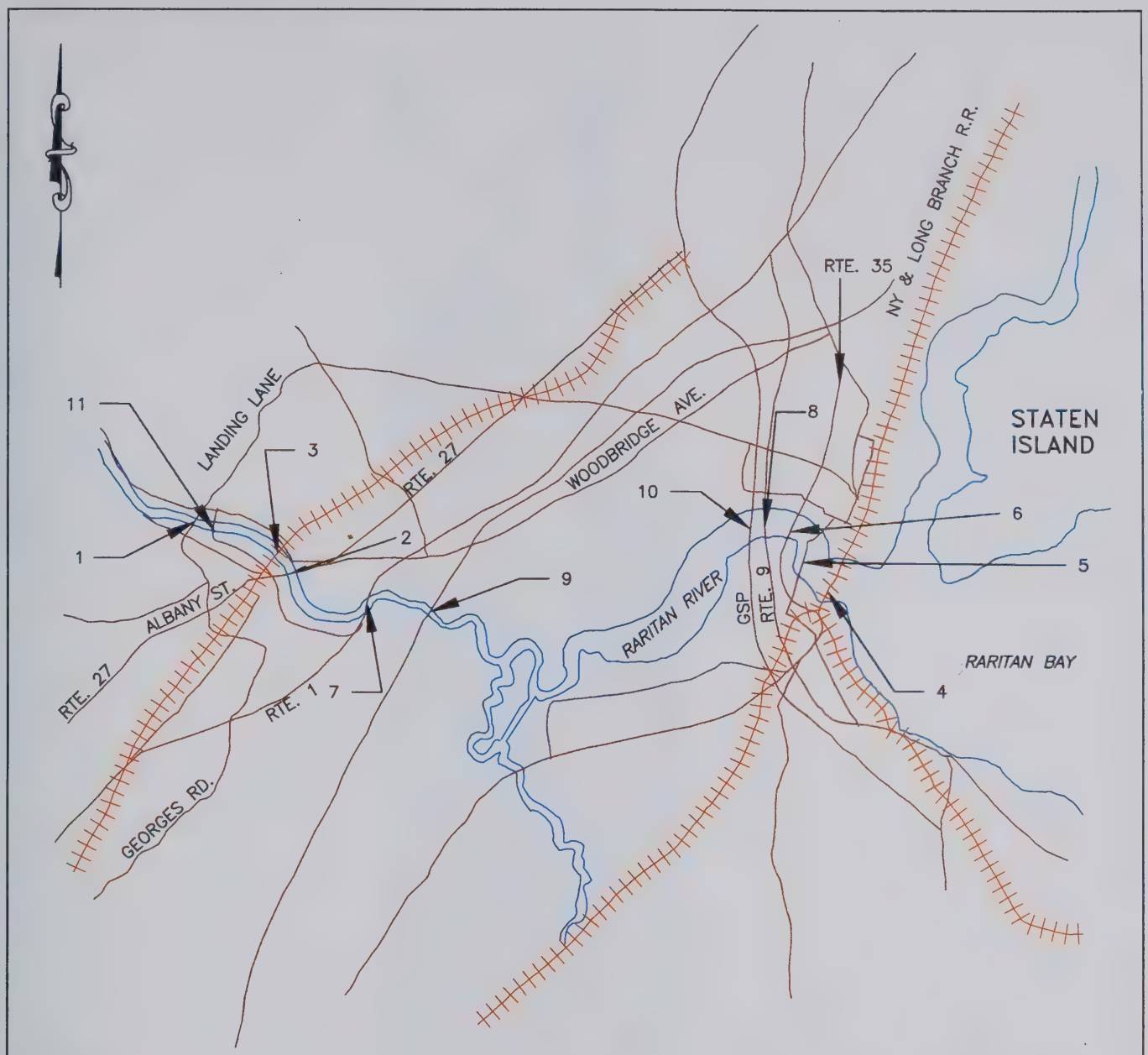
state highway system, and 45 new routes were designated, forming the main arteries linking New York, New Jersey, and Pennsylvania as well as the Jersey shore. This latest state plan included an appropriation for a new bridge across the Raritan River as part of a new highway linking the recently completed Holland Tunnel (1927) and Trenton. Credit for the inclusion of this new bridge in the state legislation was given to State Senator Morgan F. Larson from Middlesex County, chairman of the committee that prepared the highway bill (*New Brunswick Sunday Times*, February 26, 1928). Morgan Larson also served during the early 1920s as Middlesex County Engineer, and subsequently served as New Jersey's governor, from 1929 to 1932.

Construction of a new bridge across the Raritan River had been under study earlier and the project was endorsed by the New Brunswick City Planning Commission in 1924. The bridge was to be built to relieve the traffic congestion in New Brunswick caused by the bottleneck at the Albany Street Bridge, which was being widened by 14 feet that same year (A.G. Lichtenstein & Associates, Inc. 1992), and was originally intended as a replacement for that structure. It was also designed to relieve the congestion of summer traffic on the Victory Bridge downriver (see below) (*New Brunswick Sunday Times*, January 19, 1930). The recommendation from the City Planning Commission was for a new bridge to be built at the foot of Remson Street, within the city and connecting it with Highland Park (New Brunswick Chamber of Commerce 1924). The new bridge and highway were finally routed further to the east in order to bypass the city of New Brunswick and tie into the Brunswick Turnpike (the old Straight Turnpike) south of the city, creating a new "super highway" linking the Holland Tunnel with Trenton (*New Brunswick Sunday Times*, January 19, 1930).

Originally designated as Route 25, this new highway later became part of U.S. Route 1, one of the earliest major federal highways built along the east coast, running from Maine to Florida ; among the new highway's state-of-the-art design features was the cloverleaf intersection. Construction of the new Raritan River Bridge was supervised by Morris Goodkind, the Chief Bridge Engineer at the State Highway Department and a New Brunswick resident. The bridge was completed in 1929, and at that time was called the College Bridge. In 1969 it was designated as the Morris Goodkind Memorial Bridge in recognition of his contributions to the State of New Jersey (Figures 16 and 17). Goodkind was awarded the Phoebe Hobson Fowler Architectural Award by the American Society of Civil Engineers for the design of the U.S. Route 1 bridge, which reflects Goodkind's emphasis on sound bridge engineering coupled with an aesthetically pleasing design. The Goodkind Bridge is a 15-span, 1,902-foot-long open-spandrel reinforced concrete structure which, except for some changes resulting from a 1971 rehabilitation effort, remains as it was originally designed (A.G. Liechtenstein & Associates 1992). Increases in traffic over the next several decades resulted in the construction of a new bridge adjacent to the Morris Goodkind Memorial Bridge during the 1970s (Plate 7). The new structure, completed in 1974, carries the southbound lanes of U.S. Route 1 across the Raritan, while the Goodkind Bridge supports northbound traffic.

In 1896 the state legislature passed an act which provided for the construction of a bridge over the Raritan River from Perth Amboy to South Amboy. This bridge was required to contain a "draw or swing, the same to conform to the requirements of the department of war of the United States government, of such construction to impede as little as possible the navigation of said river" (State of New Jersey 1896). This act, approved by the legislature in March 1896, remained provisionally inoperative until the next annual election, at which time it was placed on the ballot as a referendum to be voted on by the general population. The 1902 proposal of the Sandford and Harris Co., builders of the Amboy Bridge, called for a revolving drawbridge constructed of steel and cast iron, with floor plank and timbers and a wood operator's cab.

At the time that the proposal for the 1929 New Brunswick bridge was under study, plans were already underway for the replacement of the drawbridge across the Raritan River between Perth Amboy and South Amboy (see Figure 16). The Amboy Bridge (also called the "county" bridge), built in 1906, had served as a key link along Route 4, and was the scene of considerable traffic congestion. The drawbridge had not been



LEGEND

ROADS AND HIGHWAYS

RAILROADS

1 LANDING LANE BRIDGE–1980S

2 ALBANY STREET BRIDGE (ROUTE 27)–1893

3 NORTHEAST CORRIDOR RAILROAD BRIDGE–1903

4 NEW YORK & LONG BRANCH RAILROAD BRIDGE–1908

5 PERTH AMBOY DRAWBRIDGE–1906

6 VICTORY BRIDGE (ROUTE 35)–1926

7 MORRIS GOODKIND MEMORIAL BRIDGE (ROUTE 1)–1928 TO 1929

8 EDISON BRIDGE (ROUTE 9)–1939

9 JOHN A. BASILONE MEMORIAL BRIDGE (NJ TURNPIKE)–1951

10 ALFRED E. DRISCOLL BRIDGE (GS PARKWAY)–1954

11 JOHN A. LYNCH BRIDGE (ROUTE 18)–1980S

0 1 2 3 4 MILES

FIGURE 16: Twentieth-Century Crossings of the Raritan River

FIGURE 17: Proposed Raritan River Bridge Near New Brunswick, 1928

SOURCE: New Jersey Department of Transportation

PLATE 7: Morris Goodkind Memorial Bridge, Upstream Elevation, Constructed in 1929; Southbound Span, Completed in 1974, to Rear

designed to handle the weight of increasingly heavy trucks. Traffic problems had become especially acute on summer weekends in the 1920s owing to the new phenomenon of automobile travel to the shore for recreation and vacation. Talk of a new bridge began as early as 1916, and by 1920 the State Highway Department had taken over the Amboy Bridge from the county and was promising to build a new bridge. In 1924 the state commissioned a report entitled *Study of Traffic on State Route No. 4 Between Perth Amboy and Asbury Park*, which presented a method for "handling this most unusual traffic situation" (New Jersey State Highway Commission, Advisory Board 1924:1). The new bridge, a deck plate girder span with a center-bearing swing span designed to accommodate vessels navigating the Raritan River, was built upstream of the Amboy Bridge (Plates 8 and 9), which was demolished during 1927-1928 at a cost of $78,000. The new bridge was completed in 1926 and was dedicated as the Victory Bridge in honor of the men and women from New Jersey who served in World War I. The 1924 report to the State Highway Commission also documented the traffic congestion along Route 4 and provided recommendations for other improvements along this important shore route. Figure 18 illustrates traffic densities across the state in 1926; the greatest densities occurred in the urban areas of Newark and Jersey City, as well as in the shore region as far south as Long Branch.

As noted above, the Victory Bridge was only a partial solution to the summer traffic problem, and serious congestion was occurring within four years of its completion. The decision to use a swing span, rather than a bascule or vertical lift span, was based on the substantial width of the river at that point, which allowed the span to be opened without interfering with dock areas on the shore (A.G. Lichtenstein & Associates, Inc. 1992). The height of the bridge, as with all bridges over navigable waterways, was set by the United States Coast Guard (John Killeen, Project Archaeologist, U.S. Army Corps of Engineers, New York District, personal communication 2000). Moreover, when the Victory Bridge was planned, its height of 28 feet above the water was declared to be sufficient to permit "most shipping" to pass under it without opening the draw. This proved not to be the case, and within a few years "insufferable" weekend traffic snarls were again paralyzing the Amboys. In 1939, for example, the draw was opened 2,979 times (Goodkind 1940a:491; *Perth Amboy Evening News* 1940a:18)

The traffic situation was aggravated in Perth Amboy by the density of cross streets along Route 4 through the city. Along the five-mile stretch between Victory Bridge and the Woodbridge cloverleaf, there were 11 traffic signals and 69 cross streets. "Despite the best efforts of the Perth Amboy, South Amboy and Woodbridge police to keep traffic moving, jams occurred each summer weekend" (*Perth Amboy Evening News* 1940a:18). Relief would come with the construction of the Edison Bridge, completed in 1939 (discussed below). The Edison Bridge, unlike the Victory Bridge, was a high-level span. During the 1930s, the design of bridges in New Jersey underwent a change: from draw or swing types, to the high-level span. This change was in response to the combined increases of automobile and pleasure watercraft traffic, which necessitated frequent bridge openings that resulted in paralyzing traffic interruptions on bridge approaches (Cranmer 1964:61).

Other major bridge and tunnel projects initiated or completed in the New York metropolitan area during the period between World War I and the Great Depression included the Goethals Bridge (1928), the Outerbridge Crossing (1928), the Bayonne Bridge (1931), and the George Washington Bridge (1931). These crossings quickly changed the region's travel patterns. In 1926, ferries provided the only means for transporting the 13,680,000 vehicles which crossed the Hudson River. Six years later, the new Hudson River bridges and tunnel were used by 28 and a half million vehicles, while 11 and a half million vehicles continued to use the ferry service. The New Jersey state legislature recognized the impact these crossings would have and appropriated $300 million in 1926 to improve the state's internal road system. The state's new highway system attracted industry, and industry attracted more residents with more vehicles. Automobilists crowded into the Jersey countryside or down at the shore as the 1920s came to a close. During the Great Depression,

PLATE 8: Victory and Amboy Bridges, circa 1927; New York & Long Branch Railroad Span Near Top *SOURCE: New Jersey Department of Transportation*

PLATE 9: Victory Bridge in 1998

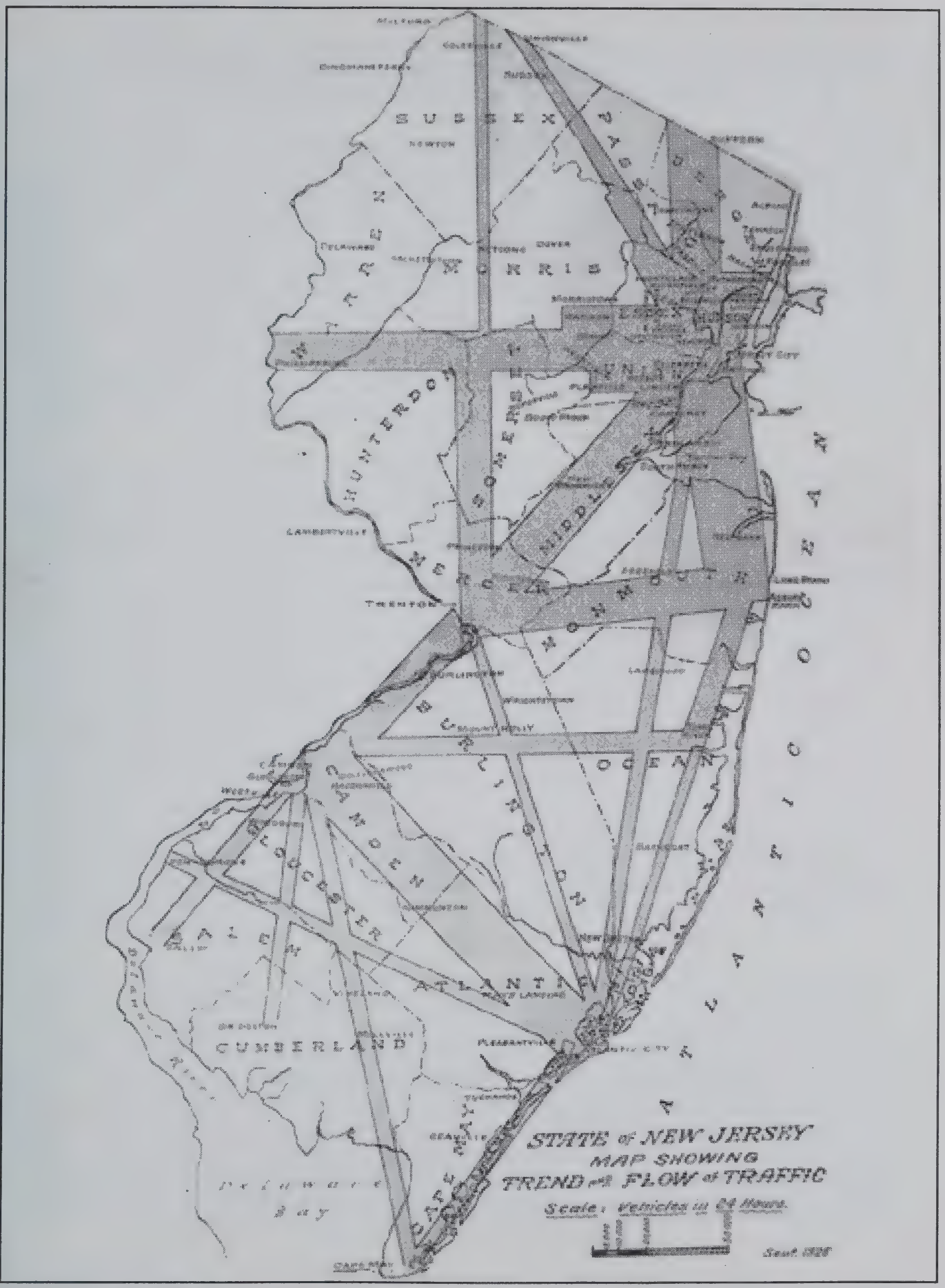


FIGURE 18: Map of New Jersey Showing Traffic Densities Throughout the State in 1926

SOURCE: NJDOT

shore communities experienced increasing numbers of automobile "daytrippers." Though daily tourists may not have added substantially to the shore's economy, families developed connections to New Jersey's seaside resorts which would bear fruit in more prosperous times (Cunningham 1966:285, 292).

Between 1930 and 1945, the combination of the general economic depression and World War II resulted in only modest growth in automobile ownership, with the number of registrations actually decreasing from year to year between 1941 and 1944 owing to war-related production requirements and rationing. During the early years of the Great Depression, major bridge and tunnel projects were conceived, studied, and built through the Public Works Administration (and other public-benefit corporations such as the Triborough Bridge and Tunnel Authority and the Port Authority of New York and New Jersey) as a way of increasing employment and improving the foundation for economic growth. Major bridges and tunnels that were completed during this period include the Triborough Bridge (1936), the Lincoln Tunnel (the first of three tubes, 1937), the Bronx-Whitestone Bridge (1939), and the Queens-Midtown Tunnel (1940). Major bridge and highway construction projects were all but halted during the years of World War II. For example, construction of the Brooklyn-Battery Tunnel was started in October 1940 and was halted for three years during the war, finally opening to traffic in May 1950.

A bridge across Raritan Bay was a project that was studied during this period, but the bridge was not constructed. The studies for the project, however, shed light on the increasing problems with traffic congestion across the Raritan River, particularly associated with travel to the New Jersey shore resorts. The Victory Bridge was opened to traffic in 1926 and, judging by the traffic volumes, became an immediate success. Maximum daily traffic counted over the Victory Bridge on a 24-hour basis was 56,000 vehicles on the Sunday preceding Labor Day in 1930; annual traffic that year was estimated at 8,265,000. (In contrast, the 1996 average daily traffic of Route 35 at Victory Bridge was 20,490 vehicles.) Engineering and economic analyses were authorized by the New Jersey legislature in 1931 to determine the feasibility of a new bridge from Staten Island across Raritan Bay to a point in northern Monmouth County. Based on origin and destination studies in 1931, approximately 26 percent of the traffic across Victory Bridge was local traffic between the Amboys or between South Amboy and points north of Perth Amboy. Approximately 74 percent of the traffic was through traffic, principally to the Jersey shore. Of the through traffic, approximately 10 percent was between southeast New Jersey and points in Manhattan, Long Island, the Bronx, and Westchester. While the engineering studies determined that a bridge at the proposed location was technically feasible, the traffic data and revenue projections indicated that the project was not financially feasible. It was further concluded that, "effective relief from congestion at the Victory Bridge can best be obtained by improved approaches through Perth Amboy and/or from the construction of an additional state highway, crossing the Raritan River somewhere west of the Victory Bridge" (Port of New York Authority 1932). That recommendation was implemented with the completion of the U.S. Route 9 Edison Bridge in 1939 (see Figure 16; Plate 10).

The Edison Bridge, like the College Bridge before it, was designed by Morris Goodkind, and was and is an important example of a very large and early continuous deck plate girder highway bridge. It was the largest, highest, and longest span bridge of its type in the United States when completed. Its erection by the Bethlehem Steel Company involved the lifting of the world's longest (260 feet) and heaviest (198 tons) girder to a height of 135 feet above the Raritan River (Berger 1998). The structure, located roughly 3,000 feet upstream of the Victory Bridge, is a 29-span continuous plate girder deck bridge that is 4,391 feet in length with a roadway 52 feet wide, carrying four lanes of U.S. Route 9. The bridge was to be the centerpiece of a plan which included the construction of a new limited-access highway around downtown Perth Amboy. The highway department called the new road the "Route 35 Extension from the Woodbridge cloverleaf to Keyport," but it became generally known as the Perth Amboy By-pass (Goodkind 1940a:491; New Jersey State Highway Department 1939:n.p.).

PLATE 10: Edison and Victory Bridges, circa 1939

SOURCE: New Jersey Department of Transportation

The state legislature appropriated funding for the project in stages. In 1935 it authorized construction of the bypass road, and approaches to the bridge were authorized. Work began that year in South Amboy with the re-routing of Routes 35 and 4 and the construction of a new intersection of those roads at a traffic circle north of South Amboy center. The approach to the Victory Bridge from the new circle was realigned and improved as well. Under the Edison Bridge contract, the new "Victory Circle" would be spanned by the two short deck bridges of the Route 35 Extension, forming the south approach to the new bridge, in a northeast-southwest direction over the Raritan River (Berger 1998). The Edison Bridge was permanently opened to traffic in November 1940, and was dedicated the following month (Berger 1998).

Following World War II, vast changes occurred in American society. U.S. production shifted to consumer goods for the domestic market, and increased prosperity, combined with pent-up demand following years of shortages and rationing, fostered automobile and home ownership. Low-density federal home ownership programs, in conjunction with increased federal and state highway building and increased automobile ownership, prompted dramatic population shifts to suburban areas, exemplified by the growth of Middlesex County. Between 1945 and 1950, the number of automobiles registered in New Jersey increased by nearly 56 percent, from 869,809 to 1,352,681. This pace continued up through 1980, with nearly 500,000 vehicles added to the roads in New Jersey every five years.

The years following World War II also represent the country's greatest period of highway construction. A system of high-speed, interstate highways was first approved by Congress in 1944, but a comprehensive program for financing and construction was not established until the Federal Aid Highway Act of 1956. Inspired by the German autobahns developed in the 1930s, President Dwight Eisenhower championed development of the Interstate Highway System, designed as a grade-separated, high-speed, limited-access system of freeways to connect major urban areas, state capitals, and major industrial centers.

For several years following World War II, New Jersey highway officials realized the need for bold planning for major traffic arteries to solve the highway problems of the state. During this period, Route 100 was conceived as an expressway connecting the New Castle-Pennsville Ferry over the Delaware River, in the southern part of the state, with the George Washington Bridge over the Hudson River in the northern part. At this same time, the Route 4 Parkway was conceived as a scenic highway connecting the populous suburban areas of northern New Jersey with shore communities from Asbury Park to Cape May. During these years before the Federal Aid Highway Act of 1956, the State Highway Department had only about $30 million a year available for state highway construction. It was clear that if these projects were to move forward, they would have to be constructed as toll roads, financed through revenue bonds. These highways were subsequently developed as the New Jersey Turnpike and the Garden State Parkway.

3. The New Jersey Turnpike

One cannot consider the New Jersey Turnpike crossing of the Raritan River without understanding the social and political climate surrounding the overall project, for in comparison to the larger task at hand, the Raritan River was merely a minor obstacle. The first major limited-access toll road in New Jersey, the New Jersey Turnpike was conceived during the initial years following World War II when increasing domestic production and the rapid growth of automobile ownership were quickly calling attention to the shortcomings of the existing highway system. Governor Alfred E. Driscoll presented his plan for the Turnpike in his first inaugural address to the legislature on January 21, 1947 (Gillespie and Rockland 1989). Legislation establishing the New Jersey Turnpike Authority was enacted in 1948, and on March 31, 1949, the three members of the Turnpike Authority were appointed by Governor Driscoll: Paul L. Troast was named chairman; George F. Smith was appointed vice-chairman; and Maxwell Lester, Jr., was appointed treasurer.

Additional top-level executives later included General W.W. Wanamaker, a retired career officer from the Army Corps of Engineers, as Executive Director, and Charles M. Noble as Chief Engineer.

The New Jersey Turnpike was not a revolutionary concept, but was rather one more link in a regional system of turnpikes which developed following the successful opening of the Pennsylvania Turnpike in 1940. At the time the concept for the New Jersey Turnpike was being developed, consideration was being given to a number of plans and ongoing new highway and bridge projects in neighboring states, including the plans for the Delaware Memorial Bridge (opened in August 1951); the Chesapeake Bay Bridge (opened in July 1952); extension of the Pennsylvania Turnpike to the Delaware River; construction of the New York State Thruway (initial 366 miles opened in 1954); continuous improvement of the Wilbur Cross Parkway in Connecticut; and the completion of the Maine Turnpike (initial 47 miles opened in December 1947). In this context, the New Jersey Turnpike was envisioned as part of an interconnected system of limited-access expressways stretching from New England to Washington, D.C.

Work began in earnest almost immediately, and the preliminary studies and reports were completed and financing arranged within about ten months. The first of more than 80 major construction contracts was awarded in December 1949, and actual construction started in the spring of 1950, at about the same time hostilities escalated into the Korean War. To advance the construction in the face of the expanding war effort, the 118-mile highway was divided into seven sections, and separate contracts for the design and supervision of construction were awarded for each section. In this way, construction proceeded simultaneously along the entire length of the Turnpike. Dedication ceremonies for the initial 93 miles between Woodbridge in Middlesex County and Deepwater in Salem County, the southern terminus, were held on November 30, 1951. The festivities on this day included a ribbon-cutting ceremony at the bridge over the Raritan River, including its dedication as the John A. Basilone Memorial Bridge (see Figure 16). Basilone, a gunnery sergeant, won the Congressional Medal of Honor on Guadalcanal and was later killed on Iwo Jima in the western Pacific. Sixteen additional miles between Woodbridge and Newark were opened in December 1951, and the final nine-mile link to the George Washington Bridge was opened in January 1952.

The Raritan River crossing by the New Jersey Turnpike is not considered a particularly distinctive or challenging example of bridge design (Plate 11). However, honors were accorded the Turnpike's crossings of the Passaic River and the Hackensack River in Hudson County. These two structures are the largest along the New Jersey Turnpike, and at the time they were built were also the longest of their type. The total length of the Passaic River bridge is 6,955 feet, while the Hackensack River bridge is 5,623 feet. Rather than requiring a clear height of 135 feet over the navigable channel (as with other major river crossings such as the Edison Bridge over the Raritan River), the War Department approved a 110-foot vertical clearance for these two Turnpike bridges, allowing the Passaic River bridge to pass beneath the deck trusses of the Pulaski Skyway. In contrast, the Turnpike's bridge over the Raritan River is 1,000 feet long and has a vertical clearance of 50 feet. The Raritan River did provide a demarcation between the northern and southern portions of the Turnpike in terms of geometric design standards. The design speed for the roadway below the Raritan River is 75 mph; north of the river it is 60 and 70 mph. Similarly, the right-of-way width was 300 feet south of the Raritan River and 250 feet north of it. These differences reflect the level terrain and rural development south of the river as compared to the varied topography and increased development north of the river (Noble 1952).

The effect of the New Jersey Turnpike on the region was felt even before the first vehicle touched the pavement. Original estimates for property acquisition were slightly more than $10 million. Actual expenditures however, reached nearly $18 million, leading many residents to contemplate the number of personal fortunes made as a result of the New Jersey Turnpike (Gillespie and Rockland 1989:29-30). Once

PLATE 11: John A. Basilone Memorial Bridge in 1998

operational, the Turnpike generated huge annual revenues, totaling more than $182 million in the late 1980s. To collect the tolls, the Turnpike Authority employs nearly 1,000 toll collectors, sergeants, lieutenants, and captains. The need for these positions provides local residents along the entire length of the Turnpike with well-paying, recession-proof jobs. Other jobs created as a direct result of the Turnpike include restaurant, maintenance, and gas station workers in any one of thirteen rest areas along the road's length (Gillespie and Rockland 1989:43-45). The main impact of the Turnpike, however, was simply the volume and speed with which interstate traffic could pass through the New Jersey corridor, much as it had for the past 300 years.

2. The Garden State Parkway

The success of the authority form of organization for the financing and construction of the New Jersey Turnpike led to its adoption for the Garden State Parkway. Although enabling legislation for the Parkway had been adopted in 1945, the lack of funds limited construction, and by 1950 only 10 miles of the Parkway between Cranford and Perth Amboy was in use. In 1952, an additional four-mile section was under construction on the northern end, to complete the Parkway to an intersection with U.S. Route 22 in Union. The Route 4 Parkway, as it was originally named, was conceived as a north-south expressway running from Paterson in Passaic County to Cape May. The Parkway was to connect with the Palisades Interstate Parkway at the George Washington Bridge via Route 6 (now known as Route 46). In 1947, the State Highway Department emphasized the increase in property valuations as an economic rationale for construction of a controlled-access parkway, citing as positive examples the Henry Hudson Parkway (1937), the Grand Central Parkway (1936), the Belt Parkway (1940), and the Bronx River Parkway (1922) (New Jersey State Highway Department 1947).

To enable financing of the Parkway and speed construction, additional legislation was enacted in 1952, creating the New Jersey Highway Authority and providing for the issuance of revenue bonds to be repaid out of revenues produced by tolls. As authorized in 1952, the project was to extend from Route 17 in Paramus or Ridgewood in a southerly direction, incorporating the section of the parkway that was previously constructed through Clifton, Passaic County, Essex County, and Union County to Woodbridge, continuing over the Raritan River in the vicinity of the Edison Bridge, then through Middlesex County and Monmouth County to Toms River, and then continuing to a point at or near the city of Cape May. The provision of funds through bond issues enabled the Highway Authority to complete 164 miles of the original project by 1955. A nine-mile extension from the Paramus area to a connector for the New York State Thruway was opened in 1957.

The original concept for the Route 4 Parkway did not include a new bridge over the Raritan River, but instead, traffic was to be routed to the Edison Bridge and the proposed New Jersey Turnpike Bridge (New Jersey Turnpike Authority 1949). However, by 1951 the average daily traffic over the Edison Bridge totaled approximately 33,000 vehicles, with a peak day of more than twice that amount (Parsons et al. 1952). Although the 1952 legislation did not specifically identify a new bridge across the Raritan River, the route for the Garden State Parkway was clearly identified as crossing "over the Raritan River." The bridge across the Raritan River was located adjacent and to the west of the U.S. Route 9 Edison Bridge (see Figure 16; Plate 12), and the vertical clearance was set at 135 feet above the navigation channel, the same as the Edison Bridge. The original bridge (later dedicated as the Alfred E. Driscoll Bridge) was constructed in 1954 with two lanes in each direction. At the time of construction, the foundations were designed and constructed to support a future widening, and the piers were built to accommodate future extension; the bridge was subsequently widened to five lanes in each direction in 1972 and further reconfigured in 1984 to provide the current six lanes in each direction. The Alfred E. Driscoll Bridge has 29 spans and a total length of approximately 4,392 feet.

PLATE 12: Route 9 Edison Bridge (left) and Alfred E. Driscoll Bridge in 1998

Like the New Jersey Turnpike, the Garden State Parkway had a profound effect on the surrounding region. At first, concerns were raised that the Parkway would have a negative economic effect on local communities. Some had theorized that the large amount of land needed for its construction would remove a substantial number of tax ratables from the lists, thus eroding important tax revenues from government coffers. Fears persisted that the anticipated economic growth resulting from the Parkway would fall short of offsetting the projected losses. However, a 1958 New Jersey Highway Authority report concluded that economic growth in the areas of retail sales, population, home building, and tax ratables among others, was greater in areas closer to the parkway than in other parts of the state (Cranmer 1964:67).

F. RECENT IMPROVEMENTS

Within the past twenty years the riverscape near New Brunswick has undergone additional change. As part of the ongoing efforts by the New Jersey Department of Transportation to improve and extend N.J. Route 18, a new bridge was constructed over the Raritan River between Landing Lane and the former Pennsylvania Railroad bridge. This new structure, the John A. Lynch Bridge (Plate 13), was completed during the 1980s, and carries Route 18 over the Raritan River to the intersection of River Road (also Route 18) and Metlars Lane. The new bridge provides a convenient link between downtown New Brunswick and the College Avenue campus of Rutgers University and the Busch, Livingston, and Kilmer campuses on the north side of the river in Piscataway. The John A. Lynch Bridge also serves to relieve traffic on George Street and the Landing Lane Bridge upstream. The steel truss Landing Lane Bridge, constructed in 1894, was replaced by an arched steel and concrete bridge (Plate 14) roughly 100 years later.

G. THE RAILROADS

At the turn of the century, the Pennsylvania Railroad embarked upon a major improvement program. The principal components of the program were the widening of the main line from two tracks to four and the elimination of grade crossings through track elevation. In New Brunswick, the new railroad bridge was to be located at a point 14½ feet north of the old bridge. To replace the bridge without interrupting the busy mainline, it was decided by George W. Mershom, the railroad's master mechanic, to move the older bridge 14½ feet south, while keeping it structurally intact. The operation proved to be a major engineering accomplishment. It was estimated that the move itself would require approximately 15 minutes, but only after months of advance preparation. On May 25, 1902, the bridge was moved. A writer for a railroad periodical described the work:

> Piers were widened, the bridge was set in cradles working on rollers. Seven engines, located on the banks and the towpath and on floats in the river, supplied the power. . . .Each engine was numbered and a corresponding number on the "tell-tale" dial, moving upward alongside an upright standard divided into feet, showed just what movement was attained by the span to which the engine was attached. In this way, each engineer was able to gauge his pulling, so that the entire structure moved in one piece, and the danger of a twist or buckle was reduced to a minimum [Horvath n.d.].

The entire operation lasted under 13 minutes, one minute and 45 seconds to move the bridge, and 10½ minutes to make it ready again for rail traffic.

The bridge that was built to replace the steel span is the one seen today (Figure 19; Plate 15). The arch viaduct, the largest stone bridge in New Jersey, consists of 21 arches and is over one mile in length. Made of sandstone block, faced in concrete in sections, the bridge closely resembles Amtrak's bridge over the Delaware River at Trenton, which is listed in the National Register of Historic Places. Construction of the bridge, completed in 1903, cost over $2 million ($37.6 million in current dollars), and it claimed the lives

PLATE 13: John A. Lynch Bridge in 1998

PLATE 14: Landing Lane Bridge in 1998

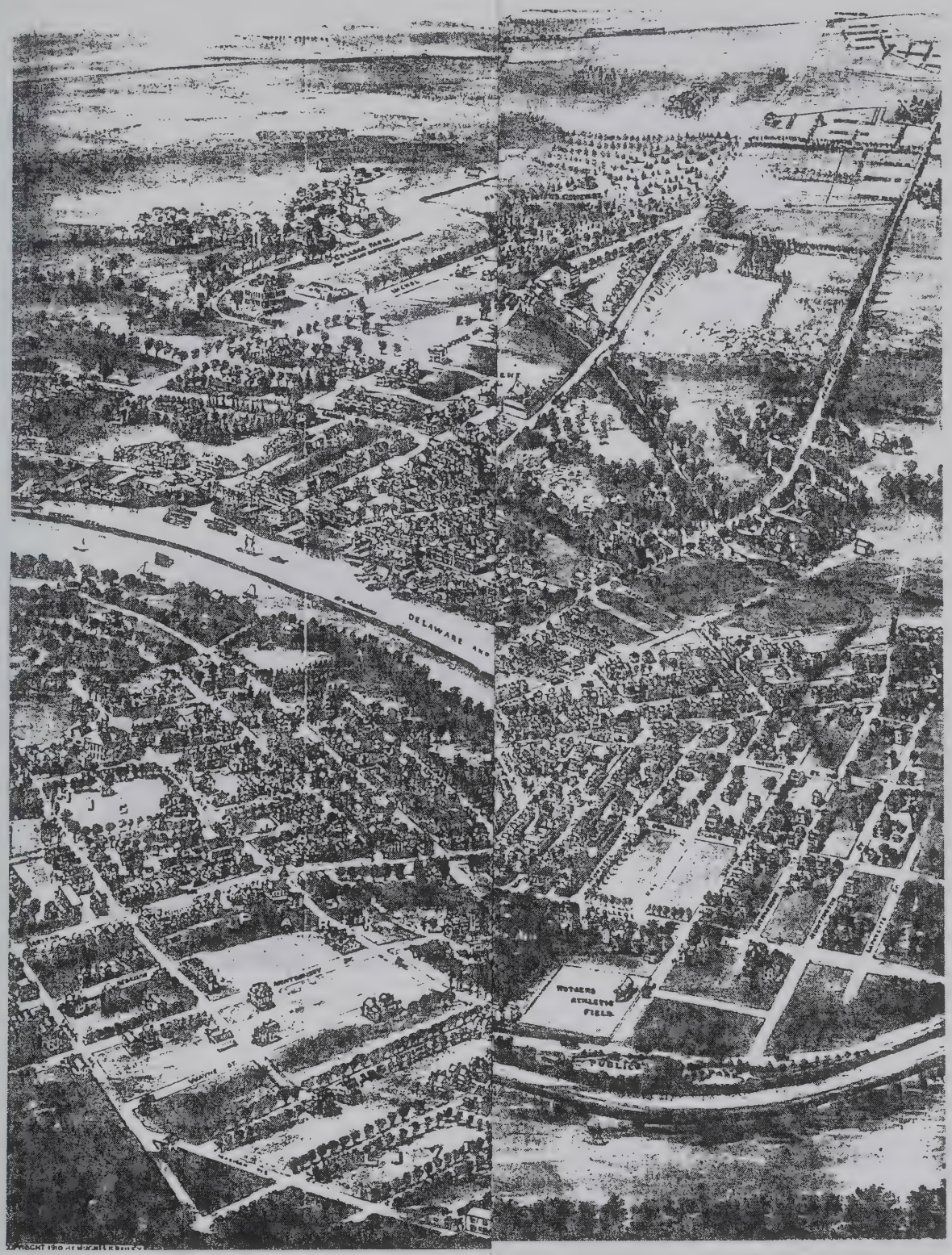


FIGURE 19: Bridges at New Brunswick, 1910

SOURCE: Hughes & Bailey 1910

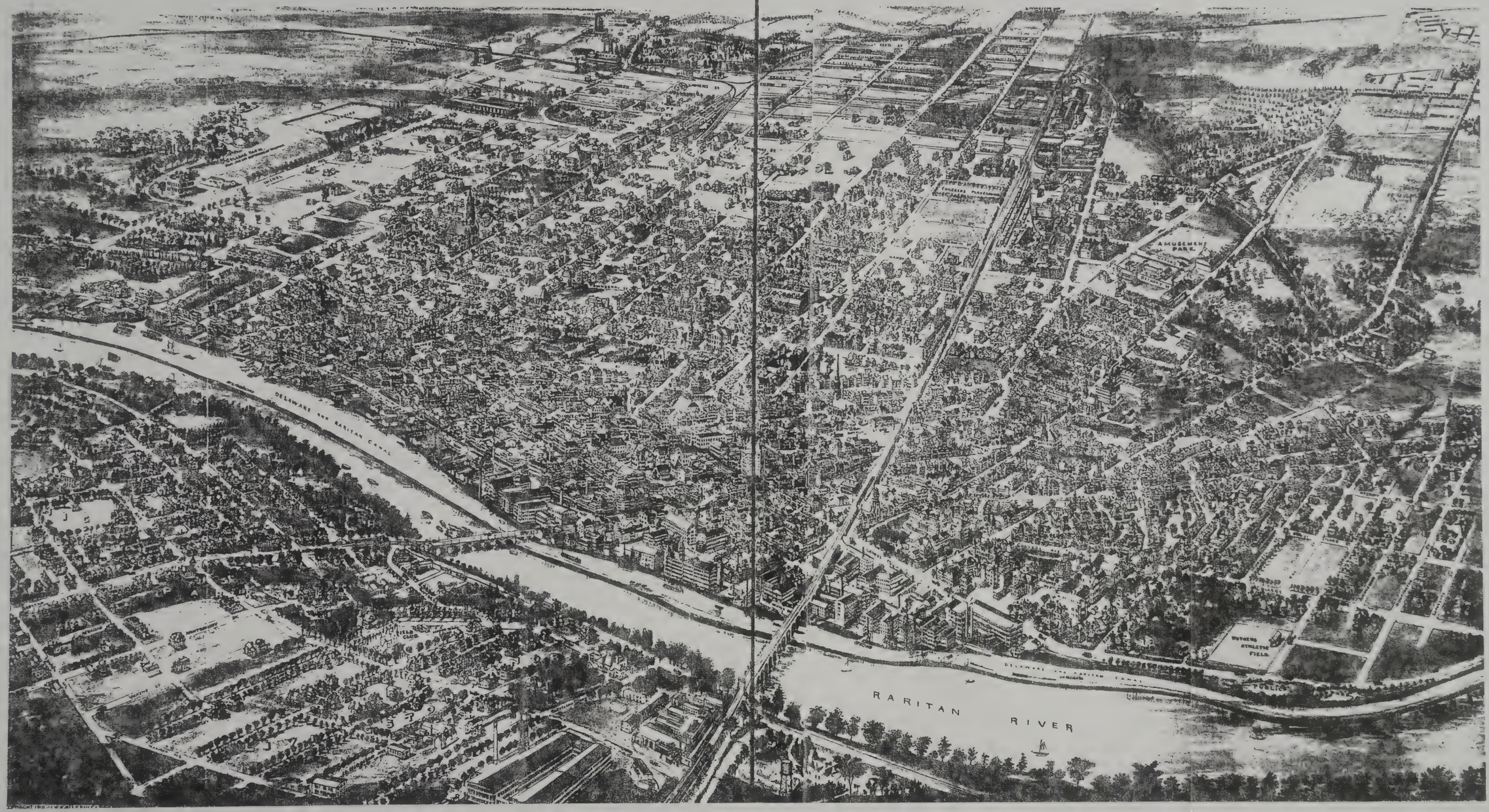


FIGURE 19: Bridges at New Brunswick, 1910

SOURCE: Hughes & Bailey 1910

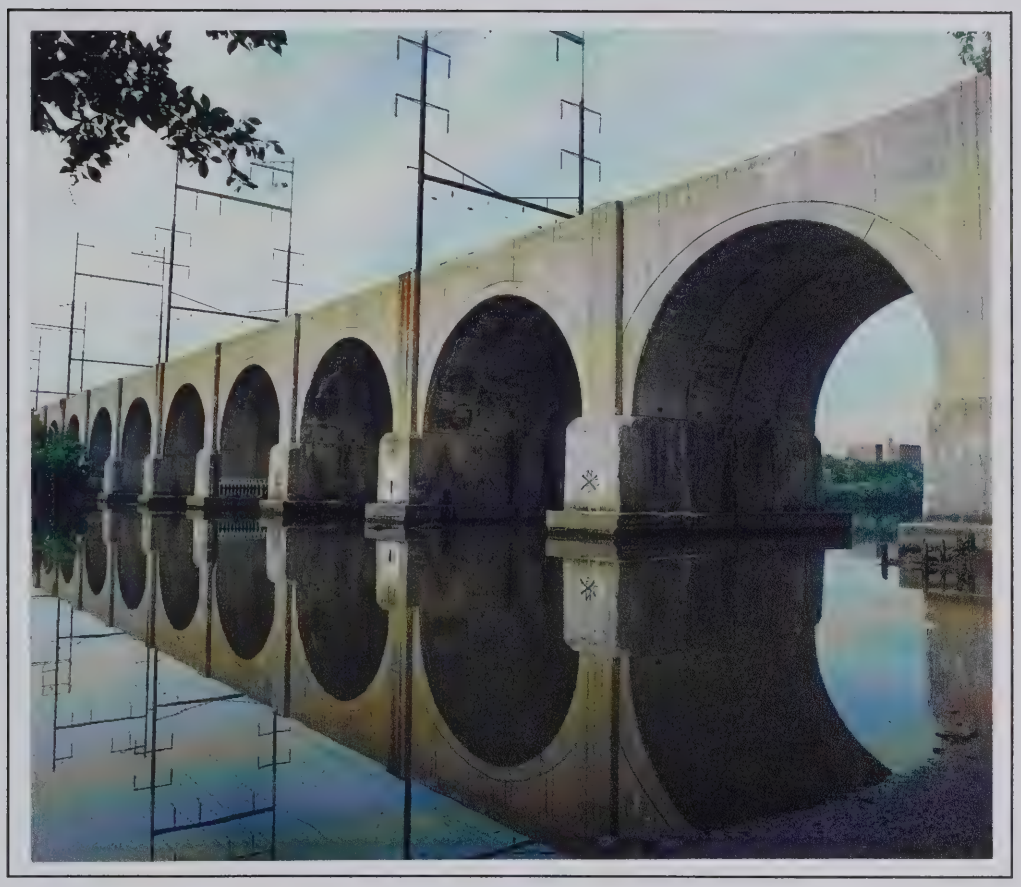


PLATE 15: Pennsylvania Railroad Bridge, Completed in 1903

of 12 construction workers. Beginning in 1943 the bridge was being encased in reinforced concrete, as it exists today. The work was stopped because of the war, and resumed in 1948. It was completed in about September 1950.

The former Pennsylvania Railroad Bridge is presently owned by Amtrak and represents a critical link in its Northeast Corridor rail operations. The span is also used by New Jersey Transit and by Conrail, the latter using the bridge for local freight runs.

At the turn of the century, partly in response to increasing competition from trolley companies, the NY&LB also embarked upon a major capital improvement program. Part of the program involved replacing the original single-track Raritan River Bridge with a 331-foot double-track swing span. The replacement project would also remove a sharp curve at South Amboy, thereby reducing the railroad's running time by five minutes. A private contractor required 50 hours starting on April 24, 1908, to remove the old bridge. The new bridge, which remains in service today, opened on April 21, 1908 (see Figure 16; Plate 16). It was constructed by the Pittsburgh Steel Company at a cost of $1 million ($16.8 million in current dollars).

The NY&LB line of the C.N.J. continued to operate successfully into the first several decades of the twentieth century, transporting vacationers and, increasingly, commuters. By the 1920s, however, the railroad was finding it increasingly difficult to compete for shore traffic with the automobile. New highway construction during the 1920s and 1930s made it easier to reach the northern New Jersey beaches by car, and vacationers came to prefer the relative freedom of driving. Hoping to lure more passengers, the C.N.J. began running the Blue Comet, a specially designed train, in 1929. While initially successful, the Blue Comet never lived up to expectations and was abandoned in 1939. By the late 1940s, ridership was confined largely to commuters who made their year-round homes in communities like Asbury Park. Service at a number of stations was curtailed or dropped altogether. In 1983, New Jersey Transit, which had purchased the entire line between Rahway and Bay Head, began direct operation of commuter rail service, which continues over the old NY&LB today.

PLATE 16: New York & Long Branch Railroad Bridge, Completed in 1908

V. CONCLUSION

V. CONCLUSION

It is perhaps a truism that every landscape is a palimpsest, the cultural features of one era masking, but never quite erasing, those of earlier periods. The lower Raritan Valley of New Jersey is no exception to this phenomenon. Roadways built during the eighteenth and nineteenth centuries survive today, buried beneath the asphalt and concrete of local roads and state and federal highways.

The lower reaches of the Raritan River are, and evidently always have been, crossed at two principal locations—at the shallows near New Brunswick and near its mouth in the vicinity of Perth Amboy. Several Native American trails converged at what is today New Brunswick, where the river could be crossed by canoe or by ford, depending on the level of the water. Not coincidentally, this stretch of river was a point on a relatively straight line between the Falls of the Delaware near Trenton and the lower Hudson Valley. What made it an attractive crossing to the native inhabitants of New Jersey also drew Europeans in the seventeenth century, and soon ferry service had been provided at this place, attracting more people who would form the nucleus of New Brunswick. Over the next three centuries, New Brunswick would become a major transportation nexus between the port cities of New York and Philadelphia, as well as a port town and manufacturing center in its own right.

East of or below New Brunswick, the river widens and is bordered by extensive marshland that would inhibit the construction of crossings until the twentieth century, when the College Bridge (Morris Goodkind Bridge) was constructed in the late 1920s, followed by the John E. Basilone Bridge (New Jersey Turnpike) built further downriver in the early 1950s. From the Basilone Bridge east to the Alfred E. Driscoll Bridge (Garden State Parkway) is a seven-mile-long stretch of river that has never supported a formal crossing. The Minisink Trail, an Indian path, evidently crossed the Raritan in the vicinity of Sayreville. Europeans preferred to cross the river by ferry between Perth Amboy and South Amboy, then connecting with and improving some parts of the Indian trails that extended south and southwest. Over the ensuing centuries, Perth Amboy, Sayreville, and South Amboy developed into important manufacturing and transportation centers, becoming part of another travel corridor, which would be influenced in large measure by the growing popularity of the New Jersey shore resorts.

The waterborne freight that was transshipped at New Brunswick between seagoing vessels and shallow-draft river craft represented an important aspect of the town's eighteenth-century and early nineteenth-century economic life, as well as that of Raritan Landing, a neighboring commercial settlement located about two miles upriver. Although Raritan Landing never fully recovered its vitality after the town endured severe damage during the Revolutionary War, and declined rapidly during the mid-nineteenth century, New Brunswick's role as a transshipment point was enhanced for a period by the construction of the Delaware and Raritan Canal, opened in 1834. Freight traffic on the canal as well as on the Raritan declined markedly after 1875, however, reflecting a general downturn in water transport in the face of railroad competition. The flow of ship and barge traffic on the lower Raritan (below New Brunswick) rose again in the 1920s, following the development of a new concentration of industrial establishments in the area between Perth Amboy and New Brunswick and the undertaking of extensive navigational improvements along that segment of the river. The renewed heyday lasted until around 1970, since which date river traffic has again declined in tandem with the related heavy manufacturing activity.

The Raritan River crossings and their associated modes of transportation are a microcosm of the economic and technological changes that transformed New Jersey over the past four centuries. From the earliest days of European settlement, the Raritan River served to link isolated farming communities and travelers with the critical markets of port cities such as New York and Philadelphia. The international and local trade that

constituted the Raritan River water traffic was the lifeblood of the economy that spurred the growth of New Brunswick and, to a somewhat lesser degree, Raritan Landing and Perth Amboy. The introduction of new routes of travel using faster, more efficient means of transportation often resulted in the demise of a once dominant form in favor of one that offered greater geographic range at a faster rate for both passengers and freight.

The decidedly limited capacity for passenger travel during the seventeenth and eighteenth centuries was increased exponentially with the introduction of railroads in the early nineteenth century. No longer were travelers at the mercy of undependable ferries, unscrupulous stage drivers, and poorly constructed, hazardous roads. Rather, trains offered passengers a relatively comfortable ride over a rail network that was expanding at a frenzied pace. As bridge technology developed to allow crossings by rail, the need for ferries quickly dissipated. Consequently, stage travel also declined, remaining important only as a peripheral connection to remote areas not yet accessible by rail. During the 1830s, the parties most affected by the competition from railroads—canal owners, turnpike companies, stagecoach and steamboat operators, and taverners—united in an attempt to publicly deride the upstart railroads with newspaper advertisements that warned, ". . . passengers traveling over fifteen miles an hour would find blood spouting from their mouth, nose, and ears" (Johnson 1987:126). This, however, did little to dissuade the public's growing enthusiasm for the comparative ease and speed of travel on the new "Iron Horse."

The growth of railroads also accelerated the emergence of the pleasure traveler. For the first time, recreational travel was available to the masses. Resort communities along the Jersey shore were a byproduct of the travel opportunities available to the urban middle class through railroads. In addition to attracting large numbers of passengers, railroads also played a pivotal role in freight movement throughout the state. The main branch of the Central Railroad was constructed principally as a shipping route for anthracite coal from Pennsylvania to New Jersey. By the first quarter of the twentieth century, railroads were the primary movers of passengers and freight across America (Cranmer 1964:29-30). The main casualty of the railroad freight capabilities were the canals. After the middle of the nineteenth century, canal freight traffic declined steadily as a result of competition from railroads. Although the Delaware and Raritan Canal operated until 1932, it did not show a profit after 1900 and was only used after 1920 by the boats and barges of the Johnson & Johnson and Standard Oil companies (Veit 1963:81). The Morris Canal suffered a similar fate, with traffic beginning its descent in 1871 and the end coming in 1924, when the canal was drained and the beds were used for various transportation projects (Johnson 1987:115; Veit 1963:54-56).

The stranglehold on transportation enjoyed by the railroads would end abruptly in the twentieth century. The growing use of trucks freed manufacturers from the limited confines of rail networks. Trucks allowed goods and produce to be shipped cheaply over a wider area, while offering the flexibility to make repeated stops without delaying other shipments (Cranmer 1964:18-19). In 1929 railroads carried more than 75 percent of all freight transported; by 1964 that figure had dropped to about 40 percent (Cranmer 1964:30). Automobiles had a similar effect on passenger traffic. No longer were people limited in respect to where they could live, work, or shop. The automobile gave travelers the freedom to journey between and beyond existing rail lines without the constraints of schedules (Cranmer 1964:18-19). At the end of World War I, 80 percent of all intercity passenger traffic went by rail, and by 1964 only about 3 percent went by rail (Cranmer 1964:30-31). These trends had a ripple effect on every aspect of life in New Jersey. The development of suburbs facilitated a massive shift in urban populations as well as the growth of populations in areas that were formerly rural. The economy of the state also underwent a transformation, as companies moved outside of traditional urban manufacturing centers, creating jobs and accelerating the growth of roads and communities in formerly underpopulated suburban and rural areas. The social habits of the populace were forever altered, with new and varied recreational opportunities within the grasp of people from all classes and economic levels.

The past has survived in New Jersey's transportation network—early European roads incorporated as part of a modern roadway and highway system—even as new patterns are created on the landscape.

VI. BIBLIOGRAPHY AND REFERENCES CITED

VI. BIBLIOGRAPHY AND REFERENCES CITED

A.G. Lichtenstein & Associates, Inc.
1991 New Jersey Historic Bridge Survey Form for Structure #1217150. Submitted to the New Jersey Department of Transportation, Trenton.

1992 New Jersey Historic Bridge Survey Form for Structure #1203150. Submitted to the New Jersey Department of Transportation, Trenton.

Alden, John Douglas, D. Stanton Hammond, John D. Widmer, and David C. Munn
1973 *Battles and Skirmishes of the American Revolution in New Jersey.* Bureau of Geology and Topography, Trenton.

Allen, Lane & Scott and the Pennsylvania Railroad
1908 *The New Jersey Ocean Resorts on the Pennsylvania Railroad, 1908.* Allen, Lane & Scott, Philadelphia.

Anderson, Elaine
1984 *The Central Railroad of New Jersey's First 100 Years: A Historical Survey.* Center for Canal History and Technology, Easton, Pennsylvania.

Anderson, J.A.
1876 *Map of the Railroads of New Jersey, and Parts of Adjoining States.* J.L. Smith, Philadelphia.

Anonymous
1776 A Map of the Country Round Philadelphia: Including Part of New Jersey, New York, Staten Island, & Long Island. *Gentleman's Magazine*, London.

Asbury Park (New Jersey) Journal
1908a Ready to Move Big Draw, Contractor Makes Plans for the Work. April 3.

1908b Bridge Ready for Use, Formal Opening is Planned. April 17.

1908c Cannot Move Bridge, Contractor's Great Task Now Apparent. April 17, 1908.

Baer, Christopher T.
1981 *Canals and Railroads of the Mid-Atlantic States, 1800-1860.* Regional Economic History Research Center, Eleutherian Mills-Hagley Foundation, Greenville, Wilmington, Delaware.

1998 Personal communication. The Hagley Museum, University of Delaware. November 18.

Bebout, John E., and Ronald J. Grele
1964 *Where Cities Meet: The Urbanization of New Jersey.* D. Van Nostrand and Company, Princeton, New Jersey.

Becker, Donald W.
1964 *Indian Place Names in New Jersey.* Philips-Campbell Publishing Co., Cedar Grove, New Jersey.

Berger, see The Louis Berger Group, Inc.

Bianchi, Leonard, and Edward S. Rutsch
1979 *Archaeological Monitoring of the Crossing of the Delaware and Raritan Canal by the New Brunswick-Parkway Connection, Middlesex County Sewerage Authority.* Historic Conservation and Interpretation, Inc., Newton, New Jersey.

Bledstein, Burton J.
1976 *The Culture of Professionalism: The Middle Class and the Development of Higher Education in America.* Norton, New York.

Blumin, Stuart
1976 *The Urban Threshold: Growth and Change in a Nineteenth-Century American Community.* University of Chicago Press, Chicago.

1989 *The Emergence of the Middle Class: Social Experience in the American City.* Cambridge University Press, Cambridge, England.

Board of Chosen Freeholders of Middlesex County [Middlesex Freeholders]
1785-1840 Minutes. On file, Special Collections Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

Board of Proprietors of the Eastern Division of New Jersey, James Alexander and James Turner
[19—] *Map No. II.* [Publisher unknown]. Facsimile of map originally printed in London in 1747. On file at the New Jersey State Library, Trenton.

Bodnar, John E.
1985 *The Transplanted: A History of Immigrants in Urban America.* Indiana University Press, Bloomington.

Brownstone, Douglass L.
1984 *A Field Guide to America's History.* Facts on File, New York.

Brush, John E.
1956 *The Population of New Jersey.* Rutgers University Press, New Brunswick, New Jersey.

Brydon, Norman F.
1970 *The Story of New Jersey's Covered Bridges: Of Time, Fire, and the River.* Published by the author, Essex Fells, New Jersey.

Burgess, George H., and Miles C. Kennedy
1949 *Centennial History of the Pennsylvania Railroad Company, 1846-1946.* The Pennsylvania Railroad Company, Philadelphia.

Burnett, Virginia S. (compiler)
1938 *New Brunswick Historical Club Papers and Addresses, 1870-1938.* New Brunswick, New Jersey.

Bush, Bernard
1986 *Laws of the Royal Colony of New Jersey 1770-1775.* Volume V:314-315. Division of Archives and Records Management, New Jersey Department of State, Trenton.

Bushman, Richard L.
1992 *The Refinement of America: Persons, Houses, Cities.* Alfred A. Knopf, New York.

Carey, H.C. & I. Lea, Henry C. Carey, and William Kneass
1822 *Geographical, Historical, and Statistical Map of New Jersey.* H.C. Carey & I. Lea, Philadelphia.

Carey, Matthew, and Amos Doolittle
1814 *New Jersey.* M. Carey, Philadelphia.

Catlin, George L.
1875 *All Rail to Long Branch, A Work Descriptive of the New All-Rail Connection from New York, via the New York & Long Branch R.R. to the Sea Shore of New Jersey and the Summer Metropolis of America.* The Central Railroad Company of New Jersey, New York.

Cawley, James, and Margaret Cawley
1965 *Along The Old York Road.* Rutgers University Press, New Brunswick , New Jersey. Available at the New Jersey State Library, Trenton.

1971 *Exploring the Little Rivers of New Jersey.* Rutgers University Press, New Brunswick, New Jersey. Available at the New Jersey State Library, Trenton.

Central Railroad Company of New Jersey
1949 *Historical Highlights.* Central Railroad Company of New Jersey, Jersey City.

Central Railroad Company of New Jersey Veteran Employees Association
1983 *Historical Highlights of the Central Railroad Company of New Jersey and Its Veteran Employees Association.* Central Railroad Company of New Jersey Veteran Employees Association, Linden, New Jersey.

Clark, Christopher
1990 *The Roots of Rural Capitalism: Western Massachusetts, 1780-1860.* Cornell University Press, Ithaca, New York.

Clark, Grace, Jessie Havens, and Stewart Hoagland
1976 Somerset County, 1688-1938; A Chronology with Tales from the Past. *Somerset Messenger-Gazette* and Ray Bateman & Associates, Somerville, New Jersey.

Coben, Stanley
1991 *Rebellion Against Victorianism: The Impetus for Cultural Change in 1920s America.* Oxford University Press, New York.

Colton, G.W. & C.B., & Company
1886 *Colton's New Jersey.* G.W. & C.B. Colton & Company, New York.

Colton, J.H., & Company
1855 *Colton's New Jersey*. J.H. Colton & Company, New York.

Comstock, Sarah
1915 *Old Roads from the Heart of New York: Journeys Today by Ways of Yesterday Within Thirty Miles Around the Battery*. G.P. Putnam's Sons, New York. Available at the New Jersey State Library, Trenton.

Conder, Thomas, and William Gordon
1788 *The Jerseys, &c. &c*. William Gordon, London. On file at the New Jersey State Library, Trenton.

Cranmer, H. Jerome
1964 *New Jersey in the Automobile Age: A History of Transportation.* The New Jersey Historical Series, vol. 23. D. Van Nostrand Company, Inc., Princeton, New Jersey.

Crowther, Samuel
1926 *Consider Middlesex County*. The Country Life Press, Garden City, New York.

Cunningham, John T.
1966 *This is New Jersey*. Rutgers University Press, New Brunswick, New Jersey

1976 *New Jersey: America's Main Road.* Doubleday & Company, Garden City, New York.

1994 *This Is New Jersey.* Fourth edition. Rutgers University Press, New Brunswick, New Jersey.

1996 *Railroads in New Jersey: The Formative Years*. Afton Publishing Co., Andover, New Jersey.

1997 *New Jersey: A Mirror on America.* Afton Publishing Co., Andover, New Jersey.

Daily Times (New Brunswick, New Jersey)
1894a Landing Bridge Goes Up in Smoke. February 19.

1894b Landing Bridge Talked Over. April 17.

1894c Freeholders in Session. May 2.

1895 Freeholders in Breezy Session. January 2.

Dalley, John
1745 *Map of the Road from Trenton to Amboy*. New York Historical Society, New York.

DeLony, Eric
1993 *Landmark American Bridges*. Little, Brown and Company, Boston.

Dunham, Azariah
1766 *A Map of the Division Line Between the Counties of Middlesex and Somerset.* On file at the New Jersey State Library, Trenton.

Dunham, Azariah, and John Hills
1984 *Plan of Middlesex County in the Province of East Jersey.* Copied from the original 1766 Dunham map by Lt. John Hills, Assistant Engineer. Clements Library, Ann Arbor, Michigan.

Durnin, Richard G.
1982 *George Washington in Middlesex County, New Jersey.* Middlesex County Cultural & Heritage Commission, North Brunswick, New Jersey.

Ellis, Franklin
1885 *History of Monmouth County.* R.T. Peck, Philadelphia.

Ewen, Daniel
1837 *Map of the City of New Brunswick, New Jersey.* Surveyed September 1836. Adopted and approved by the Common Council of the City of New Brunswick, January 13, 1837. On file at the New Jersey State Archives, the New Jersey State Library, Trenton.

Femia, Al
1987 Rich Tradition Rides N.J. Rails. *The News Tribune*, Woodbridge, New Jersey. May 10.

Ferguson, Susan
1977 *Landing Lane Bridge Replacement, SU-254 (002), New Brunswick and Piscataway Townships, Middlesex County, Cultural Resource Survey.* Bureau of Environmental Analysis, New Jersey Department of Transportation, Trenton.

Finley, A.
1824 *New Jersey.* A. Finley, Philadelphia. On file at the New Jersey State Library, Trenton.

1831 *New Jersey.* A. Finley, Philadelphia. On file at the New Jersey State Library, Trenton.

Fleming, Thomas
1977 *New Jersey: A Bicentennial History.* W.W. Norton & Company, New York.

Fligstein, Neil
1981 *Going North: Migration of Blacks and Whites from the South, 1900-1950.* Academic Press, New York.

Franklin Survey Company
1939 *Franklin Survey Company's Original Street, Road and Acreage Plat Map of Middlesex County, New Jersey.* Franklin Survey Company, Philadelphia.

Fulton, C.E.
1876 Maps of South Amboy and Woodbridge Townships. *Atlas of Middlesex County, New Jersey.* Everts & Stewart, Philadelphia. On file at the New Jersey State Library, Trenton.

Gallo, Tom, and Joel Rosenbaum
1985 *Iron Horses Across the Garden State: New York to Philadelphia by Rail.* Railpace Company, Piscataway, New Jersey.

Geological Survey of New Jersey
1892 *A Preliminary Geological Map of Portions of Monmouth and Middlesex Counties, New Jersey.* Geological Survey of New Jersey, Trenton.

Geological Survey of New Jersey, J.K. Barton, George H. Cook, and John C. Smock
1877 *Map of the Clay District of Middlesex County: Showing Location Beds of Stoneware Clay, Kaolin, and Fire Clay.* Geological Survey of New Jersey, Trenton.

Gillespie, A.K., and M.A. Rockland
1989 *Looking for America on the New Jersey Turnpike.* Rutgers University Press, New Brunswick, New Jersey.

Goodkind, Morris
1940a Design Feature of Thomas A. Edison Bridge. *Civil Engineering,* August, pp. 491-494.

1940b Construction of Thomas A. Edison Bridge. *Civil Engineering,* October, pp. 628-631.

Gordon, David M.
1978 Capitalist Development and the History of American Cities. In *Marxism and the Metropolis,* edited by W. Tabb and L. Sawers, pp. 25-63. Oxford University Press, New York.

Gordon, Thomas F., and A. Finley
1834 *New Jersey.* A. Finley, Philadelphia.

Gordon, Thomas F., and Sidney E. Morse
1842 *New Jersey.* S.E. Morse & Company, New York.

Gross, Robert A.
1988 Culture and Cultivation: Agriculture and Society in Thoreau's Concord. In *Material Life in America, 1600-1860,* edited by Robert Blair St. George, pp. 519-533. Northeastern University Press, Boston. Originally published in 1982.

Grossman, Joel, and Richard Porter
1979 *Raritan Landing Archaeological District.* National Register of Historic Places Nomination Form. On file at the New Jersey Historic Preservation Office, Trenton.

Heritage Studies, Inc.
1984 A Cultural Resource Reconnaissance for the New Brunswick-EDPAS Housing Project, City of New Brunswick, Middlesex County, New Jersey. Prepared for New Brunswick-EDPAS, Inc., by Heritage Studies, Inc., Princeton.

Hills, John
1781 A Map of Middlesex County. *A Collection of Plan's &c. &c. &c. in the Province of New Jersey.* Portolan Press, Brielle, New Jersey.

Holland and Jeffreys
1768 Map of New Jersey. On file, Special Collections Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

Home News (New Brunswick, New Jersey)
1975 Bridging the Gap to New Brunswick. July 10.

Horvath, Tom
n.d. The PRR Bridges at New Brunswick, NJ. *Railpace Magazine*, Piscataway, New Jersey.

Hughes & Bailey
1910 *Aero View of New Brunswick, New Jersey*. Hughes & Bailey, New York.

Jackson, Donald C.
1994 *Early American Technology: Making and Doing Things from the Colonial Era to 1850.* Edited by Judith A. McGaw. University of North Carolina Press, Chapel Hill.

Jackson, John P
1860 *Map of the Railroads of New Jersey*. Endicott & Company, Lithographers, New York.

Jackson, Kenneth T.
1985 *Crabgrass Frontier: The Suburbanization of the United States.* Oxford University Press, New York.

Johnson, A.J.
1868 *Johnson's New Jersey*. A.J. Johnson, New York.

Johnson, James P.
1987 *New Jersey, History of Ingenuity and Industry*. Windsor Publications, Northridge, California.

Johnson, S.W.
1806 *Rural Economy: Containing a Treatise on Pisé Building; As Recommended by the Board of Agriculture in Great Britain, with Improvements by the Author; on Buildings in General; Particularly on the Arrangement of Those Belonging to Farms; on the Culture of the Vine; and on Turnpike Roads*. I. Riley and Co., New York. Printed by William Elliot, New Brunswick, New Jersey.

Kalm, Peter
1937 *The America of 1750; Peter Kalm's Travels In North America*, vol. 1. Revised from the original Swedish and edited by Adolph B. Benson. Wilson-Erickson Inc., New York. Available at the New Jersey State Library, Trenton.

Kasson, John F.
1990 *Rudeness & Civility: Manners in Nineteenth-Century Urban America.* Hill and Wang, New York.

Kraft, Herbert
in press *The Lenape: Archaeology, History and Ethnography.* New Jersey Historical Society, Newark.

Kobbé, Gustav
1889 *The New Jersey Coast and Pines*. Published by the author, Short Hills, New Jersey. On file at the New Jersey State Library, Trenton.

Lane, Wheaton J.
1939 *From Indian Trail to Iron Horse: Travel and Transportation in New Jersey, 1620 - 1860.* Princeton University Press, Princeton, New Jersey.

Larkin, Jack
1988 *The Reshaping of Everyday Life, 1790-1840.* Harper & Row, New York.

Larrabee, Edward McM.
1982 New Jersey's Cultural Resources: A.D. 1800-1865. In *New Jersey's Archaeological Resources from the Paleo-Indian Period to the Present*, edited by Olga Chesler, pp. 220-240. Office of New Jersey Heritage, Trenton.

League of Women Voters
1961 *This Is Perth Amboy.* League of Women Voters, Perth Amboy, New Jersey.

Lewis, J. Volney, and Henry B. Kümmel
1910-1912 *Geologic Map of New Jersey.* New Jersey Geological Survey, Trenton.

Lewis, Samuel, William Barker, and William Guthrie
1795 *The State of New Jersey: Compiled from the Most Authentic Information.* M. Carey, Philadelphia.

Lewis, Samuel, and John Marshall
1807a *A Plan of the Northern Part of New Jersey, Shewing the Positions of the American and British Armies after Crossing the North River in 1776.* C.P. Wayne, Philadelphia.

1807b *A Map of the Country from Rariton River in East Jersey to Elk Head in Maryland Shewing Several Operations of the American and British Armies, in 1776 and 1777.* C.P. Wayne, Philadelphia.

Lewis, Samuel, and Henry S. Tanner
1804 *New Jersey.* J. Conrad, Philadelphia.

Lin, James
1998 *The History of the Lincoln Highway.* October 7. Web pages@ www.ugcs.caltech.edu/~jlin/lincoln/history/.

The Louis Berger Group, Inc. [Berger]
1983 *A Cultural Resource Reconnaissance for the Lower Raritan River Multipurpose Study.* Prepared for the United States Army Corps of Engineers by Louis Berger & Associates, Inc., East Orange, New Jersey.

1991a *Phase II Archaeological Investigations of the Haviland, Isaac Clark, Kingston Grid, and Charles Moore Sites, US Route 1/NJ Route 27 Segment for New Jersey Route 92, Middlesex County, New Jersey.* Prepared for the Federal Highway Administration and New Jersey Department of Transportation, Trenton, by Louis Berger & Associates, Inc., East Orange, New Jersey.

1991b *Phase I Cultural Resource Survey PSE&G/SQUIBB M&R Station and 6" Pipeline Connection at M.P. 1792.50 Transcontinental Gas Pipe Line Corporation, North Brunswick Township, Middlesex County, New Jersey.* Prepared for Transcontinental Gas Pipe Line Corporation, Houston, Texas, by Louis Berger & Associates, Inc., East Orange, New Jersey.

1991c *Landing Bridge, New Brunswick and Piscataway Township, Middlesex County, New Jersey. Historic Structure Documentation for the Historic American Engineering Record.* Prepared for Buchart Horn, Inc., Marlton, New Jersey, by Louis Berger & Associates, Inc., East Orange, New Jersey.

1998 *Historic American Engineering Record, Thomas A. Edison Bridge.* Prepared for the New Jersey Department of Transportation, Trenton, by Louis Berger & Associates, Inc., East Orange, New Jersey.

MacKenzie, Clyde L., Jr.
1992 *The Fisheries of Raritan Bay.* Rutgers University Press, New Brunswick, New Jersey.

Matthai, Julie A.
1982 *An Economic History of Women in America: Women's Work, the Sexual Division of Labor, and the Development of Capitalism.* Schocken, New York.

McCormick, Richard
1976 *New Brunswick During the Revolution.* Transcript of lecture presented at Rutgers University , New Brunswick, New Jersey. On file at the New Jersey State Library, Trenton.

McGinnis, William C.
1958 *History of Perth Amboy, New Jersey, 1651-1958.* American Publishing Company, Inc., Perth Amboy, New Jersey.

McKelvey, William J., Jr.
1975 *The Delaware and Raritan Canal: A Pictorial History.* Canal Press, Inc., York, Pennsylvania.

Menzies, Elizabeth G.C.
1969 *Millstone Valley.* Rutgers University Press, New Brunswick, New Jersey. Available at the New Jersey State Library, Trenton.

1976 *Passage Between Rivers: A Portfolio of Photographs with a History of the Delaware and Raritan Canal.* Rutgers University Press, New Brunswick, New Jersey.

Meuly, Walter C.
1976 *History of Piscataway Township, 1666-1976.* Piscataway Bicentennial Commission by the authority of the Piscataway Township Council. Available at the New Jersey State Library, Trenton.

Middlekauf, Robert
1982 *The Glorious Cause, The American Revolution, 1763-1789.* Oxford University Press, New York.

Middlesex County Council
1964 *Inside Middlesex County, New Jersey*. Middlesex County Council and League of Women Voters, New Brunswick.

Middlesex County Industrial Department
1953 *Middlesex County, New Jersey, Near the Crowd but Not in It*. Middlesex County Industrial Department, New Brunswick.

Mihalenko, Ruth Peterson
1977 *North Brunswick: A Township History*. Sponsored by the North Brunswick Bicentennial Committee, Somerset, New Jersey.

Moraley, William
1992 *The Unfortunate: The Voyage and Adventures of William Moraley, an Indentured Servant*, edited by Susan E. Klepp and Billy G. Smith. The Pennsylvania State University Press, University Park, Pennsylvania. Available at the New Jersey State Library, Trenton.

Moss, George H.
1966 *Steamboat to the Shore*. Jersey Close Press, Locust, New Jersey.

Mudge, David, and David Zmoda
1982 *Raritan Landing Archeological District (Addendum)*. National Register of Historic Places Nomination Form. On file at the New Jersey Historic Preservation Office, Trenton.

National Board of Fire Underwriters
1950 *The South Amboy Port Explosion, South Amboy, N.J., May 19, 1950*. Report by The National Board of Fire Underwriters, New York, and The Fire Insurance Rating Organization of New Jersey, Newark.

Needles, Enoch R.
1952 Revenue Bonds Build 118-mile Expressway. *Civil Engineering,* January, pp. 31-35.

New Brunswick City Planning Commission
1924 *Industrial Survey, City of New Brunswick, Middlesex County, New Jersey*. New Brunswick City Planning Commission, New Brunswick, New Jersey.

New Brunswick (New Jersey) Sunday Times
1924 Many Tales Cluster About Site of Albany Street Bridge. May 25.

1928 Construction of New Raritan River Bridge Will Begin Soon. February 26.

1930 New Raritan Bridge Called Substantially and Architecturally Fine. January 19.

New Jersey Board of Public Utility Commissioners, Division of Railroads
1941 *Railroad Map*. New Jersey Board of Public Utility Commissioners, Division of Railroads, Trenton.

New Jersey Department of Environmental Protection, Division of Parks & Forestry, Historic Preservation Office

1996 *New Jersey & National Registers of Historic Places, 1970 through 1995.* Compiled and edited by Robert W. Craig with assistance from Susan Pringle, George Chidley, Terry Karschner, Dan Saunders, Kinney Clark, Corinne Cowan, and Erica Olszak. Historic Preservation Office, Trenton.

New Jersey Division of Geology, New Jersey Geological Survey, and New Jersey Department of Public Roads

1916 *Road Map of New Jersey.* State of New Jersey, Department of Conservation and Development, Division of Geology, Trenton.

New Jersey Geological Survey, New Jersey. Division of Geology and Waters, and New Jersey State Highway Commission

1925 *Road Map of New Jersey.* State of New Jersey, Department of Conservation and Development, Division of Geology and Waters, State Geologist, Trenton.

New Jersey Harbor Commission

1914 *Map Showing the Proposed New Jersey Ship Canal.* New Jersey Harbor Commission. On file at the New Jersey State Library, Trenton.

New Jersey State Archives

v.d. Canal Petitions and Reports, 1765-1835. On file at the New Jersey State Archives, New Jersey State Library, Trenton.

New Jersey State Highway Commission, Advisory Board

1924 *Study of Traffic on State Highway Route No. 4, Between Perth Amboy and Asbury Park: Recommendations for Relieving Present Traffic Congestion and for Providing Adequate Facilities for Handling Anticipated Traffic: Report of the Advisory Board to the New Jersey State Highway Commission.* MacCrellish and Quigley Co., Trenton. Available at the New Jersey State Library, Trenton.

New Jersey State Highway Department

1935 *Annual Report of the New Jersey State Highway Department of the Year 1935.* New Jersey State Highway Department, Trenton.

1937 *Annual Report of the New Jersey State Highway Department of the Year 1937.* New Jersey State Highway Department, Trenton.

1938 *Annual Report of the New Jersey State Highway Department of the Year 1938.* New Jersey State Highway Department, Trenton.

1939 *Annual Report of the New Jersey State Highway Department of the Year 1939.* New Jersey State Highway Department, Trenton.

1940 *Annual Report of the New Jersey State Highway Department of the Year 1940.* New Jersey State Highway Department, Trenton.

1947 *New Jersey's First Parkway, Route 4.* New Jersey State Highway Department, Trenton.

New Jersey State Highway Department, Bureau of Highway Planning Survey
1950 *General Highway Map, State of New Jersey.* New Jersey State Highway Department, Trenton.

1954 *General Highway Map, State of New Jersey.* New Jersey State Highway Department, Trenton.

New Jersey Turnpike Authority
1949 *Traffic and Revenue Report.* Prepared by Coverdale and Colpitts, Consulting Engineers. New Jersey Turnpike Authority, Trenton.

News Tribune, The (Woodbridge, New Jersey)
1987 N.J. Legislature Issued Nation's First Charter in 1816. May 10.

Nielson Papers
1780-1920 Personal and business papers of the Nielson family. On file, Special Collections Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

Niemcewicz, Julian Ursyn
1965 *Under Their Vine and Fig Tree: Travels through America in 1797-1799, 1805 with some Further Account of Life in New Jersey.* Translated and edited by Metchie J.E. Budka. Published as vol. XIV in the Collections of the New Jersey Historical Society at Newark by the Grassmann Publishing Company, Inc., Elizabeth, New Jersey. Available at the New Jersey State Library, Trenton.

Noble, Charles M.
1952 Standardized Design and Careful Scheduling Speed Construction. *Civil Engineering,* January, pp. 40-45.

Otley, J.W., and J. Keily
1850 *Middlesex County, New Jersey.* Lloyd Van Derveer, Camden, New Jersey.

Painter, Nell Irvin
1987 *Standing at Armageddon: The United States, 1877-1919.* W.W. Norton, New York.

Parsons, Brinckerhoff, Hall & MacDonald
1952 *Traffic and Earnings on the Garden State Parkway, Irvington to Manasquan.* Prepared for the New Jersey Highway Authority, Trenton.

Perth Amboy (New Jersey) Evening News
1940a Early Ferries Were Popular. October 11, pp. 17 and 20.

1940b Edison Bridge Opens Today for Weekend; "Ceremony" Is Staged. October 11, pp. 1, 18, and 21.

1940c First Bridge over Raritan Was Landing. October 11, pp. 21.

Pickersgill, Harold E.
1937 *Nova Caesaria and Ompoge Point Which Later Became New Jersey and Perth Amboy.* Prepared for and presented to the public high school seniors by the Exchange Club of Perth Amboy, New Jersey. Available at the Perth Amboy Public Library.

Piscataway Township Libraries
n.d. *Historic Piscataway*. The Piscataway Township Libraries, Piscataway, New Jersey.

Port of New York Authority
1932 *Report on Preliminary Investigation for Proposed Bridge Across Raritan Bay.* January 27. Port of New York Authority, New York.

Railroadians of America
1985 *The Next Station Will Be. . .A Book of Photographs of Railroad Depots on the New York & Long Branch Railroad.* Railroadians of America, Livingston, New Jersey.

Regan, Timothy E.
1996 *Images of America: New Brunswick.* Arcadia Publishing, an imprint of the Chalford Publishing Corporation, Dover, New Hampshire.

Regional Plan Association
1954 *Population, 1954-1975 in the New Jersey-New York-Connecticut Metropolitan Region.* Regional Plan Association, New York.

Reilly, George L.A.
1951 *The Camden and Amboy Railroad in New Jersey Politics, 1830-1871.* Ph.D. dissertation, Columbia University, New York.

Roberts, Russell, and Richard Youmans
1993 *Down the Jersey Shore*. Rutgers University Press, New Brunswick, New Jersey.

Rock, Howard B.
1979 *Artisans of the New Republic: The Tradesmen of New York City in the Age of Jefferson.* New York University Press, New York.

Rosenbaum, Joel
n.d. Take the Pennsy to the North Jersey Coast. *Railpace Magazine*. Piscataway, New Jersey.

Rosenbaum, Joel, and Joyce Gallo
1986 The South Amboy Local. *Railpace Magazine* (July). Piscataway, New Jersey.

Rosenbaum, Joel, and Tom Gallo
n.d. Down to the Seashore on the C.N.J., The NY&LBRR Story. *Railpace Magazine*. Piscataway, New Jersey.

1983 Down to Barnegat Bay on the P.R.R. and C.N.J. Part 1, The P.R.R. *Railpace Magazine* (December). Piscataway, New Jersey.

1984 Down to Barnegat Bay on the P.R.R. and C.N.J. Part 2, The C.N.J. *Railpace Magazine* (January). Piscataway, New Jersey

Rosenbaum, Joel, Tom Gallo, and Bill Longo
1982 A Short History of the New Jersey Southern. *Railpace Magazine* (December). Piscataway, New Jersey.

Rundel, John, Jr.
1816 *A Map Shewing the Route of a Canal Connecting the Tide Waters of the Delaware with those of the Raritan: Laid Out Pursuant to Instructions from the Commissioners Appointed by an Act of the Legislature passed 13th February 1816.* On file at the New Jersey State Archives, the New Jersey State Library, Trenton.

Schlereth, Thomas J.
1991 *Victorian America: Transformations in Everyday Life, 1876-1915.* Everyday Life in America Series. HarperCollins, New York.

Schmidt, Hubert G.
1973 *Agriculture in New Jersey: A Three-Hundred-Year History.* Rutgers University Press, New Brunswick, New Jersey.

Seely, Bruce Edsall
1987 *Building the American Highway System: Engineers as Policy Makers.* Temple University Press, Philadelphia.

Seguine-LeVine, Joan
1996 *Images of America: Perth Amboy.* Arcadia Publishing, an imprint of the Chalford Publishing Corporation, Dover, New Hampshire.

Sellers, Charles
1991 *The Market Revolution: Jacksonian America, 1815-1846.* Oxford University Press, New York.

Sheehan, David C.
1991 *Welcome to Edison An Enlightened Community.* The Edison Township Historical Society, Edison, New Jersey.

Sipes, William B.
1875 *The Pennsylvania Railroad: Its Origin, Construction and Connections.* The Pennsylvania Railroad Passenger Department, Philadelphia.

Sloan, W.G.
1926 *State of New Jersey Map Showing Trend and Flow of Traffic.* Report of the State Highway Engineer to the New Jersey State Highway Commission. On file, New Jersey Department of Transportation, Trenton.

Snell, James P.
1881 *History of Hunterdon and Somerset Counties, New Jersey.* Everts & Peck, Philadelphia.

Snyder, John P.
1973 *The Mapping of New Jersey: The Men and the Art.* Rutgers University Press, New Brunswick, New Jersey.

South Amboy (New Jersey) Citizen
1962 The New York & Long Branch Railroad. August 9.

St. John, Donald
1936 New Jersey Railroad Completed Tracks from Newark to Highland Park Side of Raritan. *New Brunswick (New Jersey) Sunday Times*, July 12.

Staniford, Charles W.
1925 *Industrial Survey and Report of the Raritan District Made to the Port Raritan Survey Commission*. Port Raritan Survey Commission. On file, Special Collections Archives, Alexander Library, Rutgers University, New Brunswick, New Jersey.

State of New Jersey
1790 *Acts of the Fifteenth General Assembly of the State of New Jersey*. Neale and Lawrence, Burlington, New Jersey.

1792 *Acts of the Seventeenth General Assembly of the State of New Jersey*. Isaac Collins, Trenton, New Jersey.

1796 *Acts of the Twenty-First General Assembly of the State of New Jersey*. Matthias Day, Trenton, New Jersey.

1799 *Acts of the Twenty-Third General Assembly of the State of New Jersey*. Gershom Craft, Trenton, New Jersey.

1896 *Acts of the One Hundred and Twentieth Legislature of the State of New Jersey*. MacCrellish & Quigley, Trenton, New Jersey.

Stokes, William A. (with others)
1874 *Report of the Investigating Committee of the Pennsylvania Railroad Company, Appointed by Resolution of the Stockholders at the Annual Meeting Held March 10, 1874*. Allen, Lane, and Scott, Philadelphia.

Studley, Miriam V.
1964 *Historic New Jersey Through Visitors' Eyes*, vol. 18. The New Jersey Historical Series. D. Van Nostrand Company, New York. Available at the New Jersey State Library, Trenton.

Survey Map Company
1910 *Middlesex County, New Jersey*. Survey Map Company, New York.

Sutherland, Daniel E.
1989 *The Expansion of Everyday Life, 1860-1876*. Harper & Row, New York.

Tanner, Henry S., J. Knight, and Thomas F. Gordon
1836 *New Jersey, Reduced from T. Gordon's Map*. H.S. Tanner, Philadelphia.

Thompson, Robert H.
1939 *Transportation Combines and Pressure Politics in New Jersey, 1833 - 1836*. Proceedings of the New Jersey Historical Society 57:1 and 2, January and April. On file at the New Jersey State Library, Trenton.

Trenton Printing Co., Inc.
1939 *Suggestions for Trips in New Jersey*. 2nd edition. Trenton Printing Co., Inc., Trenton, New Jersey.

Troast, Paul L.
1952 Limited-Access Turnpike Relieves Congestion. *Civil Engineering,* January, pp. 26-27.

Van Hoesen, Walter H.
1976 *Early Taverns and Stagecoach Days in New Jersey*. Fairleigh Dickinson University Press, Madison, New Jersey.

Veit, Richard F.
1963 *The Old Canals of New Jersey: A Historical Geography*. New Jersey Geographical Press, Little Falls, New Jersey.

Wacker, Peter O.
1975 *Land and People; A Cultural Geography of Preindustrial New Jersey: Origins and Settlement Patterns*. Rutgers University Press, New Brunswick, New Jersey.

Wacker, Peter O., and Paul G.E. Clemens
1995 *Land Use in Early New Jersey: A Historical Geography*. New Jersey Historical Society, Newark.

Wall, John P.
1931 *The Chronicles of New Brunswick, New Jersey, 1667-1931*. Thatcher-American Company, New Brunswick, New Jersey.

Wall, John P., and Harold E. Pickersgill (editors)
1921 *History of Middlesex County, New Jersey, 1664-1920*. 3 vols. Lewis Historical Publishing Company, New York.

Walling, Henry F.
1861 *Map of the County of Middlesex, New Jersey*. Smith, Gallup & Holt, New York.

Watkins, J. Elfreth
1891 *The Camden and Amboy Railroad: Origin and Early History*. Address delivered at Bordentown, New Jersey, November 12, 1891. Press of Gedney & Roberts, Washington, D.C. On microform at the New Jersey State Library, Trenton.

Wieland, Carl
1925 The Mercer and Somerset Railway: An Adventure in Railroading in the Vicinity of New Brunswick. *New Brunswick (New Jersey) Sunday Times*, December 27.

Wildes, Harry Emerson
1943 *Twin Rivers: The Raritan and the Passaic*. Farbar and Rinehart, New York.

Wilson, Harold F.
1964 *The Story of the Jersey Shore*. D. Van Nostrand Company, Princeton.

Wolf, Peter E.
1977 *The Geology and Landscapes of New Jersey*. Crane Russack, New York.

Wood, Don, Joel Rosenbaum, and Tom Gallo
1985 *The Unique New York & Long Branch*. Hillcrest Press, Hannacroix, New York.

Works Progress Administration, Federal Writers' Project
1939 *New Jersey: A Guide to Its Past and Present*. Hastings House, New York.

Worlidge, John, and John Thornton
1986 *A New Mapp of East and West New Jersey*. Rutgers University Libraries, New Brunswick, New Jersey. Originally published in London by John Thornton ca.1700.

Yamin, Rebecca
1982 Raritan Landing. In *Raritan Landing: The Archaeology of a Buried Port*. Joel W. Grossman, Principal Investigator, with contributions by Gail M. Ashley and others. Rutgers Archaeological Survey Office, Department of Human Ecology, New Jersey Agricultural Experiment Station, Cook College, Rutgers University, New Brunswick.

1988 *The Raritan Landing Traders: Local Trade in Pre-Revolutionary New Jersey*. Ph.D. Dissertation, New York University, New York.

NJDOT RESEARCH LIBRARY
3 4310 00004 0157